RAILROAD GAZETTE

FRIDAY, SEPT. 5.

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Contributions.

75-ton Baldwin Switching Engines.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In a recent number of your paper you referred to a purchase by the Chicago, St. Paul, Minneapolis & Omaha Railroad of some 75-ton switching locomotives from the Baldwin Locomotive Works. Will you kindly tell me what are the general dimensions of these locomotives? C. R.

The locomotives referred to were illustrated in the *Railroad Gazette* of Sept. 27, 1889, and the following are their general dimensions:

Actual weight in working order, exclusive of tender	150,000 lbs.
Actual weight on driving wheels	135,000 lbs.
Estimated weight of tender, including coal and water	75,000 lbs.
Estimated weight of locomotive and tender in working order	225,000 lbs.
Cylinders	22 × 28 in.
Driving wheels, four pairs coupled	50 in.
Total wheelbase	22 ft. 3 in.
Driving wheelbase	14 ft.
Total wheelbase of engine and tender	49 ft.
Boiler of steel, ⅝ in. thick; diameter	72 in.
Height of centre line of boiler above rails	7 ft. 8 in.
Fire-box 10 ft. 1 in. long by 42⅝ in. wide inside.	
Tubes 271 in number, 2¼ in. diameter, 13 ft. 6 in. long.	
Heating surface of fire-box	172 sq. ft.
Heating surface of tubes	2,121 sq. ft.
Total heating surface	2,393 sq. ft.
Tank capacity	3,600 galls.

Railroad Bridges and Floating into Position.

MONTREAL, Sept. 1, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I notice in your issue of the 22d of August an account of floating into position a span of 523 ft. of the Ohio Connecting Railway. This plan is not novel. The two spans of the Royal Albert bridge at Saltash, in the west of England—455 ft. each—were constructed alongshore and floated into position, 100 ft. clear above high water. This bridge was completed in 1859, and is mentioned by Mr. Booth in your issue of the 8th of August. He is, however, wrong in stating that the spans were "jacked up;" on the contrary, they were *lowered* into their seats upon the piers.

It is pleasing to read Mr. Booth's description of the late Sir I. K. Brunel's great work. It is well worth a visit by engineers; for boldness and novelty, it is to my mind unrivaled. That it is not better known to the profession can only be attributed to its being out of the line of what is called here through travel. Its centre pier, which is of masonry and about 35 ft. in diameter, *is founded 95 ft. below high water*. Compressed air was used, and I believe was the first (1854) trial of the kind.

Mr. Booth's description of the lightness of the piers surprises me. In reality there is nothing *light* about this bridge but in its general appearance, which is most impressive for its symmetry and grace.

Sir I. K. Brunel's other bridges, mentioned by Mr. Booth as "timber viaducts," have stood 40 years, are of masonry piers, and (now), I am informed, have iron superstructure, although originally the trusses were of wood; and some of these, or subsequent, wooden trusses, I infer, remain—possibly to prolong the early associations of construction—but, I understand, they are relieved from use by iron girders inside.

To revert again to the floating into position of bridge trusses, those of the International Bridge across the Niagara River at Buffalo were erected —1870 to 1873—on pontoons just up-stream of the piers, and were floated into position by guiding the pontoons and filling them with water sufficiently to lower the trusses upon the piers. These spans are pin-connected—a series of 197 and 248 ft. The velocity of the water, its depth, and rocky bottom did not permit stationary falsework to be used for the mid-channel spans.

E. P. HANNAFORD.

Rail Circuit and Wire Circuit Signals.

AUBURNDALE, MASS., Aug. 19, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

It does not seem to me that you can have read very carefully the lecture notes on the Hall Signal, which were published in your issue of Aug. 8, else you would not have fallen into the error of supposing that they were in any sense a discussion of the relative merits of rail circuit and wire circuit signals, as you seem to have done. Beyond the simple statement that "the rail circuit still pretends to accomplish two things the Hall signal does not do," there is not even an allusion to rail circuits. I only tell what the new Hall signal had done up to the time these notes were written, and with no comparison of that signal with any other, except to say that I have not had experience with any which has shown so few failures. I do not here intimate how nearly or remotely the rail circuit accomplishes what is expected of it, nor my own opinion of its value; that part of the subject is discussed in other lectures (to which I must refer you), and somewhat at length in articles I have written on automatic signals in the last two or three years. I therefore fail to see the relevancy of your disclaimer that you "particularly do not wish to endorse what I say about rail circuits," and "that there is another side to that question that those interested in the matter may learn from those who use the track circuit."

I should be very glad to avail myself of the experience of those who have used rail circuit signals, and whose results and conclusions are different from my own, and I should esteem it a favor if you would put me in the way of obtaining further information.

It does not give me great discomfort that "there are a good many who differ from" me in my views concerning the protection the Hall signal gives, because most of them have had little or no experience with automatic signals of any kind, and their judgment must therefore have a negative rather than a positive value. You might have gone farther, and have said (what would be perfectly true) that there are many who would differ from me as to the desirability of automatic signals at all. Some of them would prefer a rheumatic old man with a piece of dirty bunting and a lard-oil lantern, to be displayed 10 minutes and then taken in, to a fine piece of machinery, which indicates with certainty whether or not a train has passed a *particular point* a mile or two in advance. In view of the progress which has been made in the last few years, it is surely dogmatic to say what can or can not be done by the use of certain modifications and improvements which I could not describe, even in general terms, because they were the subject of patents which were not issued.

The science of automatic signaling is too new and is advancing too rapidly for any one person to "know it all." Great progress has been made in the last 10 years, but although certain of its principles may be considered now pretty well established, there are still important problems which are not yet completely solved. Time, patience and an intelligent co-operation on the part of railroad management is needed to work them out. The proper function and the value of automatic signals are coming to be more and more clearly recognized, and there will yet be given "honor to whom it is due." Not yet has perfection or the limit of what can be accomplished been reached. For the present, it may perhaps be sufficient to say that those railroads which have had the most experience with automatic signals would be the most unwilling to dispense with them, and many would be quite as likely to abandon point switches and interlocking for the antiquated devices they displaced.

GEO. W. BLODGETT.

[Perhaps the difference of opinion between Mr. Blodgett and ourselves is more apparent than real. We quite realized that he attempted no discussion of the relative merits of the two systems, but his words, "the rail circuit . . . *still pretends* to accomplish two things which this does not," certainly carry the impression even to the careful reader that he does not think that it does accomplish those two things. The "two things" referred to are to show danger if a train breaks and leaves a car in the section, or if a rail is broken. This *is* done by the rail circuit (we do not say that it *never* fails), and we do not know of any way of doing it automatically without the rail circuit. This was why we did not wish to endorse what Mr. Blodgett said about the rail circuit. Mr. Blodgett wishes it distinctly understood that what he said in his notes was not a discussion of the merits of the two systems. We wish the same to be understood of this note. Such a discussion to be just would require much space and the presentation of a great body of facts.—EDITOR RAILROAD GAZETTE.]

When Should a Signal be put to "Danger?"

CHICAGO, Aug. 6, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Judging from your editorial of July 4 touching various points of argument in my paper read before the Association of Railway Telegraph Superintendents at Niagara Falls, it appears that we share a wide difference of opinion in one matter at least. I am so confirmed in my belief in the "proper method" of manipulating block signals—a belief open to conviction, but which discussion with many experienced railroad men, both assenters and dissenters, only serves to strengthen—that I cannot overlook your criticism, nor forbear pointing out to you what appears to me to be one of those inconsistencies of which I have already written.

Unfortunately, perhaps, for the maintainance of the position I assume, I am unable to refer to the page of the history of railroad practice which records the appearance of the scheme of joint responsibility of train and enginemen, and I do not know positively that its necessity was made manifest by the "running by" of train order boards, but I have good reasons to believe that this had much do to with it. If it did, will it be difficult to imagine that at first the only use of the train order board was that to which you wish to limit the block signal, namely, to warn the engineman; and that experience demonstrated its incompleteness in that it had not also warned the conductor? Are we not, as I have suggested in my paper, really repeating an old experience, when in running our trains under a block system we compel our trainmen to accept without question the engineman's advance as authorized? This is certainly what we do, it seems to me, when our block signals are raised at any time, but when the entire train has passed. How can you consistently admit that "joint responsibility of conductor and engineer is all right," and yet claim that the signal has "actually been used," when the engineer alone has used it? If you take this stand, you must consider it just to suspend a conductor an equal period with his engineman, thereby judging him equally guilty, because the latter ran by a block signal set against him, and which the former had no means of seeing either in its clear or danger position. This has been done on one of our prominent railroads, which adopts the plan of throwing the signal "to danger immediately after the engine (or foremost vehicle) of a train has passed it." The uniform flagging rules, if properly observed, will protect a train in every ordinary situation, and it is a case of culpable neglect when collisions occur at meeting points; it has been urged that these flagging rules must be as rigidly enforced within as without the blocked section; therefore, I do not see wherein collisions at meeting points and the inability of the conductor, because of his remote position from his enigneman, to check the blunders of the latter, offers any argument for or against the system. Wherein would the requirement that the rear brakeman shall see the signal go to danger introduce harmful complications that do not exist in the enforcement of Rule 524 A. of the Uniform Rules, the proper interpretation of which requires the engineman to see the telegraph signal go to safety?

The manipulation of the signals according to the "model" plan is practicable, and the provision of simple and inexpensive mechanical contrivances avoids all waste of time of the signalman, and can even prevent him from admitting a second train which he should hold.

I mean just what I have written when I assert that "certain circumstances often compel the maintenance of a *comparatively* high rate of speed," and feel that I am not encouraging the transgression of the "rule of control" in making this assertion. I do feel, however, that this rule like many others could be better enforced, and better obeyed for that matter, if a limited construction would be put upon its interpretation. Have you, Mr. Editor, ever asked railroad men what they meant when they spoke of a train "being under control," and have you found any two original definitions alike? I have asked the question many times and find that superintendents themselves differ and are apparently content in remaining in opinions that believe in one case a train under control "when it is completely stopped," in another, "when equipped with best appliances for stopping at six to ten miles per hour," and in still another, "when it can be stopped within its length." The best definition, in my opinion, was the one which, in the first place, was based on the assumption that an engineman would be prudent, not foolhardy, and then declared that a train was under control when it could be stopped "within the range of vision." Accepting this definition am I as inconsistent with the requirements of the best service, and do I render the rule as liable to violation by men ready with an argument as those under whom the needs of the service require one thing and a limited interpretation under a literal definition imposes another.

I admit that the use of the term "traffic" as applied to train service is not literally correct. I gave it a comprehensive significance which technical usage seems almost to have adopted. Do you consider my use of the term any more questionable than yours in the ninth line of the second paragraph? By the way, the omission of the qualifying adjectives in both sentences, which you criticise, somewhat affects their sense. This will apply as well, I think, to much of the omission in the "abstract" itself. W. W. NICHOLS.

What follows was written by a well-known superintendent, who has given much attention to signaling. It was not written as a reply to or comment on Mr. Nichols' communication, but presents some of the

arguments on the other side and may appropriately follow that communication:

It has been held by some that the trainmen as well as the engineer should be held responsible for knowing the position of signals, and that even the brakemen should be entrusted with this important duty. I do not agree with this view, but think that, while the conductor is equally responsible with the engineer for the safety of his train as regards time of leaving stations, acting either under special or telegraphic orders, or in accordance with standing rules applicable to the rights of his train, it is the engineer, or possibly the engineer and his fireman, who should alone be held responsible for the care of the train while in motion, and for the proper observance of the signals which govern the right of the train to proceed; and this view is held to be the best practice for the reasons that the engineer has, first, his own reputation at stake as a careful and trustworthy man; and, further, has his own personal safety as well as that of his passengers also at stake, and has, besides, that special training and experience which do or should make him more alert, painstaking and accurate in observing signals, as well as more keenly alive to their supreme importance. Moreover, the engineer, in addition to his acquirements through his training and mechanical skill, should be, and he generally is, an intelligent man and a man of character and worth, all whose associations and interests tend to make him value and cultivate the best qualities, mental and moral; whence it follows that we may naturally expect him to be more amenable to discipline and instruction than the average brakeman, who, having far less responsible duties, does not feel their weight as does the engineer, the very nature of whose calling demands high-toned and conscientious service.

[The principal point made by Mr. Nichols we leave for discussion at a future time; but in passing, we call his attention to the fact that abstracts made for the purpose of saving space often take off the delicate edge of any writer's ideas. Busy newspaper readers will not read an article that they would readily listen to from the author's lips, because in cold print it seems too long. In reading a condensation they pay the penalty for not attending the meetings where speakers and their ideas and enthusiasm can be enjoyed at first hand and in their fulness; and the speaker pays the penalty for not preparing two articles, one for oral delivery and one for print. The question of the proper use of the term "traffic" we leave to the judgment of those who have read both Mr. Nichols' paper and our comment upon it. As for Mr. Nichols' position concerning the running of trains "under control," we, of course, recognize that he is decidedly ahead of the average practice in this respect, and indeed in advance of the *thinking* as well as the practice of the average superintendent; but we do not admit his right to compare himself with low standards. When he is discussing principles before a body of experts he should take nothing but absolute right for his standard.—EDITOR RAILROAD GAZETTE.]

Union Pacific Water Tanks.

The new 16 ft. x 24 ft. water tanks on the line of the Union Pacific Railroad, shown herewith in several figures, have many points of interest, because of the good mechanical features of the details and the facility afforded in filling locomotive tanks. Fig. 1 shows a half exterior elevation, and a half vertical section on a plane perpendicular to the track. Here can be seen the diagonal bracing, the spout lifting devices, valve connections, binding hoops, foundations, and all the general features.

In fig. 3 are given details of the valve connections and spout lifting devices, together with an enlarged section of the flooring. Fig. 2 shows a plan of foundations and pipe connections. The tank is covered with a ceiling of ⅜-in. pine nailed to 2 × 6-in. joists with one layer of building paper above the ceiling. The roof is formed of ⅜-in. pine laid over one layer of building paper, with the joints covered with beveled battens. The valves are of babbitt and have rubber seats. All bolts passing through the tank are wound with oakum and white lead to prevent leakage. The rafters in the roof are 2 × 6 in., placed as shown in fig. 1, and the staves are 2¾ in. thick and 6 in. wide, laid without dovetails. The hoops are 4½ in. wide and $\frac{3}{8}$ in. thick, riveted to the buckles, which are drawn together by two bolts 1 in. diameter and 11½ in. long. The capacity is about 48,000 gallons.

Altogether this design is a fine one, and the details are admirably worked out on the complete set of drawings sent us.

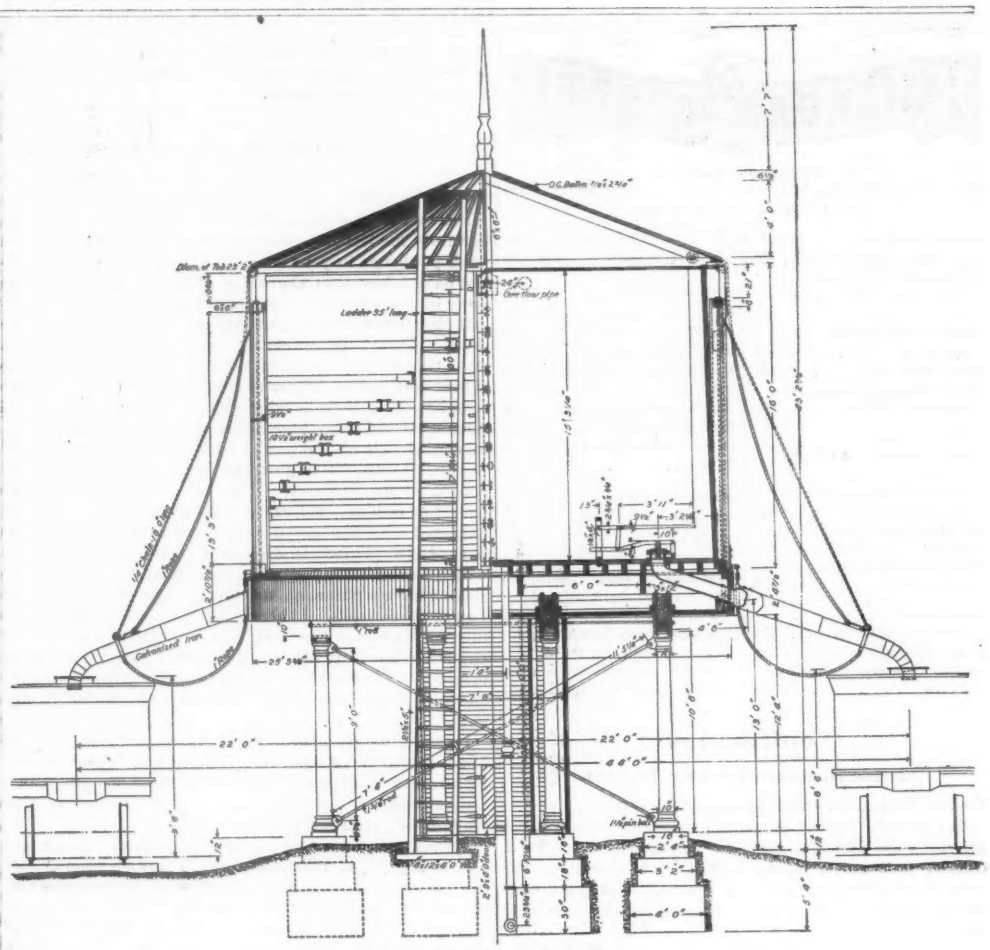


Fig. 1—Elevation and Section.

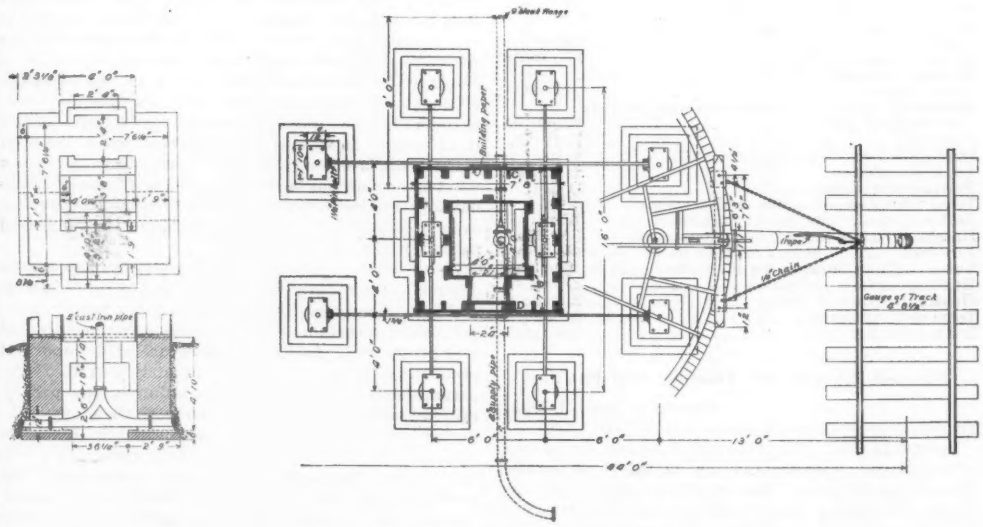


Fig. 2—Foundation and Pipe Connections.

UNION PACIFIC WATER TANK.

The Consolidated Car Heating Co.'s Systems.

The Consolidated Car Heating Co. is a consolidation of five different companies, which have been equipping cars in this country for some time past. The scope of the company is intended to include everything required for car heating, ventilation and electric lighting, from a full train equipment with locomotive attachments to the smallest fitting. Eight thousand cars have been equipped, and nearly 100 railroads are using the devices. Some of the more important specialties are as follows:

Automatic temperature regulator for keeping the temperature of a car between 68 and 72 deg. F.

Commingler storage system: a direct steam or hot water circulating system, at will. A single valve controls the change from one system to another. It is applicable to any direct steam system of piping now in use.

Disk drum system, used in connection with any water heater.

Trap valve, which obviates the necessity for an expansion trap.

Fire-proof heater with and without a double coil, each of the double coils being on an independent circuit.

Return system, especially adapted for elevated roads, allowing no escape of steam or water to the street below.

Street car heating system by storage.

There are also several important special details as follows:

Consolidated steam hose coupler with either ball, swivel or hose connection, water heater, safety valve, expansion drum, with partition and expansion saddle for the same on the top of the car.

This company has in advanced state of preparation a system of electric lighting which will light each car independently, and which is said to require but little power from the locomotive.

The following is a general description of two of the more important details. The commingler is a small device shown by the accompanying cut, which is placed under opposite middle seats at the side of a car and between the floor of the car and the sheathing, thus utilizing space not otherwise occupied. Into this commingler, 3 *A*, steam enters from the train pipe, through the regulating valve, 3*B*, at a very low pressure—about 2 lbs.—and thence makes its way into the heating pipes of the car, following the course shown by the arrows in the cut. As heat is given out the steam condenses and the water of condensation returns to the lowest part of the system—the commingler, 3 *A*—where additional steam is continually and noiselessly injected into the water. In this accumulating water heat is stored and mildly radiated therefrom, until finally the whole piping becomes filled, and a circulation of hot water is created by the steam, which is noiselessly injected therein through the commingler, 3 *A*.

When the piping is full the surplus condensation overflows through overflow fitting, 3 *K*, and thence through the trap cock, 29, down the pipe connected therewith to the drip, where it falls to the ground. The trap cock, 29, takes the place of a thermostatic trap. The drip cannot freeze, as it is in metallic contact with the base of the commingler, 3 *A*, which base is directly connected with the train pipe, and so is always filled with steam. This feature of drip protection is patented, and is used generally upon the systems of the Consolidated Car Heating Co.

By opening the drain valve, 3 *H*, controlled by the wheel, 3 *F*, the water of condensation is drained from the system and the apparatus then becomes a simple direct steam system. When steam is first turned on the

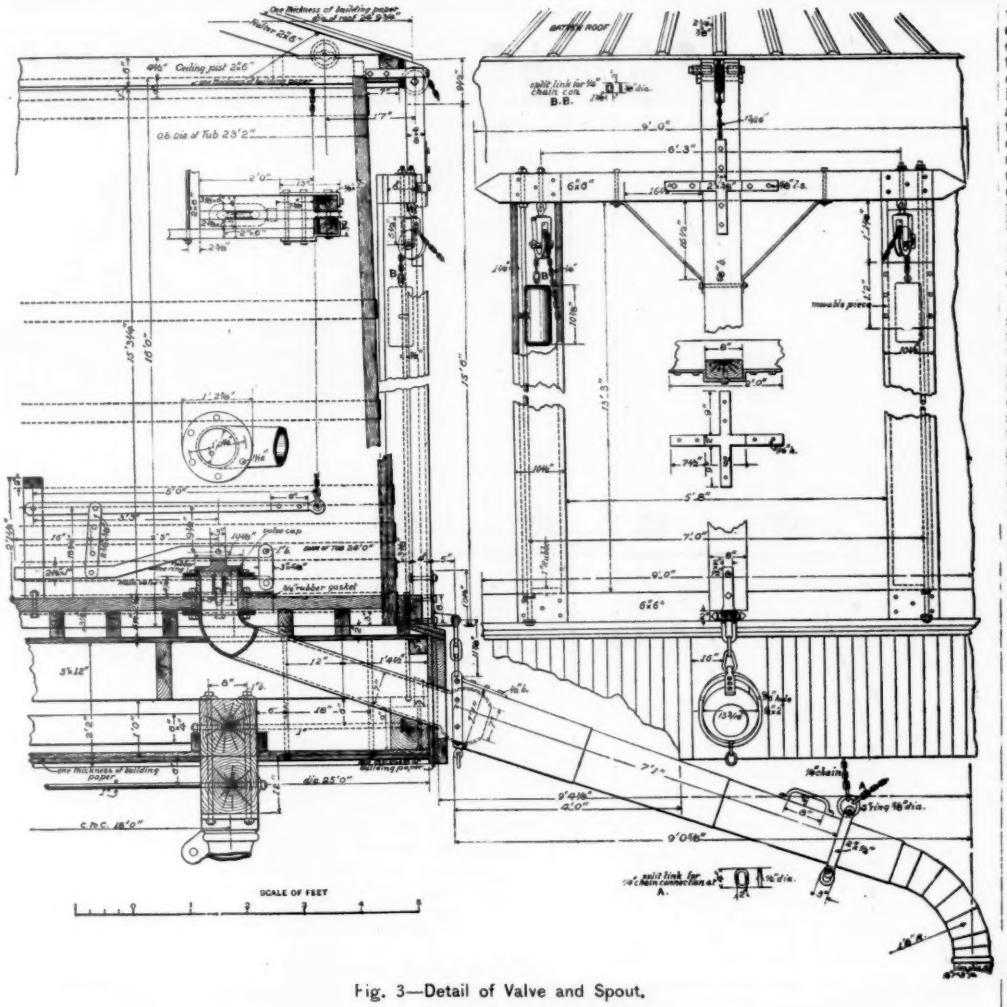


Fig. 3—Detail of Valve and Spout.

UNION PACIFIC WATER TANK.

car is quickly heated by direct steam; wheel 3 *F* is then turned, the drain valve, 3 *H*, is so closed, and the direct steam system gradually and automatically converts itself into a hot-water circulating system.

Whenever, at stations or elsewhere, it is desired to avoid any drip, the trap cock, 29, is shut, and not a drop of water can escape.

When the car is laid off for the night or for more than three or four hours (for three or four hours it will keep warm from stored heat), the drain valve, 3 *H*, and the regulating valve, 3 *B*, are opened, and the entire system is quickly emptied of water, air entering up through the drip pipe and overflow fitting, 3 *K*. The car is then ready to stand out indefinitely in any temperature whatever, without danger of any part of the apparatus freezing, and is also in readiness to be quickly heated by direct steam when again brought into use. Like apparatus is placed on each side of the car, thus allowing each side to be heated separately. Where the automatic temperature regulator is applied it controls the admission of steam to both sides of the car.

The trap, cock and valve have already been shown in the *Railroad Gazette* of May 2, 1890.

The temperature regulator is actuated by a fluid within a diaphragm. The fluid is exceedingly sensitive to change of temperature above 68 degrees. Below this point it remains passive. At, say 68 degrees, or whatever it may be adjusted for, it vaporizes and exerts a pressure under the diaphragm; and, owing to the area of the diaphragm, the pressure exerted is sufficient to close the steam inlet valve of any of the Consolidated Car Heating Co.'s systems.

The diaphragm containing this fluid is placed in proper position in the car, to be actuated by the average temperature. A cam, rotated by an index lever, pivoted on the centre of the diaphragm, compresses the diaphragm to such extent as may be required to prevent the operation of the steam valve until a temperature of 73 degrees is reached, consequently it will be seen that by adjusting this lever in accordance with the dial any degree of temperature may be maintained that may be desired between 68 and 74 degrees.

The following are the points of advantage claimed for the Commingler system:

Gives all advantages of direct steam or hot water heat. Can be changed from direct steam (quick heat) to hot water (equable heat), or the reverse, as often as may be required. Is extremely simple, and easily and economically applied. All apparatus is practically inside of car and cannot freeze. No thermostatic trap is used. Discharge of water under car can be shut off at stations. Requires, even in freezing weather, only about 2 lbs. of steam pressure. Any degree of heat desired may be obtained with this apparatus. Where cars are already equipped for steam no new piping is required. All working parts are shipped in one piece, and this is readily put in place. Does not take up available room in car, but does utilize space not otherwise occupied. If automatic temperature regulator is attached, no care of car is required after steam is turned on from locomotive.

This company has general offices in the Commercial Bank Building, Albany, New York, and branch offices in Chicago, New York City and Canada. It has issued a list of 83 railroads now using its devices, and a circular letter from Mr. George Westinghouse, Jr., President of the company, from which the following extract is made:

It is conceded that the warming of railroad cars by steam generated in the locomotive has become more than an experiment; in fact, many railroad officials express the opinion that this method must become universal; but to become universal uniform apparatus and practice will be necessary on all connecting lines. As regards the use of like apparatus on all lines, the arguments which have heretofore prevailed with reference to brake apparatus can be equally well advanced in favor of uniformity in steam-heating apparatus; and this uniformity in steam-heating apparatus will, as has been the case with brakes, be much more likely to result from the concentration of the business in the hands of one concern, having the necessary capital and organization to manufacture the apparatus needed to meet all requirements, and owning also the patents necessary to insure to the users reasonable freedom from the annoyances of patent litigation than in any other way. Indeed, the little progress so far made in fitting cars has been due to the difficulties arising from the use of dissimilar systems, which were fully comprehended by the Consolidated Co. After a careful investigation I became convinced that it is far in advance of all other companies in the completeness of its several systems and in the scope and strength of its patents. The Consolidated Co. is already the owner of the Sewall Drum, the McElroy Commingler and other valuable systems, in all of which are combined desirable features of steam and water heating.

The Commingler system, it seems to me, most nearly solves the problem of car heating. This system involves the use, within the car, of pipes containing water, with which steam is noiselessly commingled through an ingenious device which has the effect of quickly heating and circulating the water, and admits of the utilization of a great part of the latent (stored) heat, which is necessarily wasted in all direct steam systems, and secures the regulation of the temperature of the water from 70 degrees up to whatever is required for the coldest weather; thus making it possible to avoid the annoyance and discomfort which result from the use of those systems whereby the steam is admitted directly into the pipes at not less than 212 degrees. The pipes of the Commingler system may be used without an auxiliary water heater, or they may be connected to a coil within a stove, so that fire may be applied and the circulation and heat kept up when the car is disconnected from the locomotive; although the heat ordinarily contained in this considerable body of water will suffice for maintaining a fair temperature within a car for some time after the steam from the engine has been turned off.

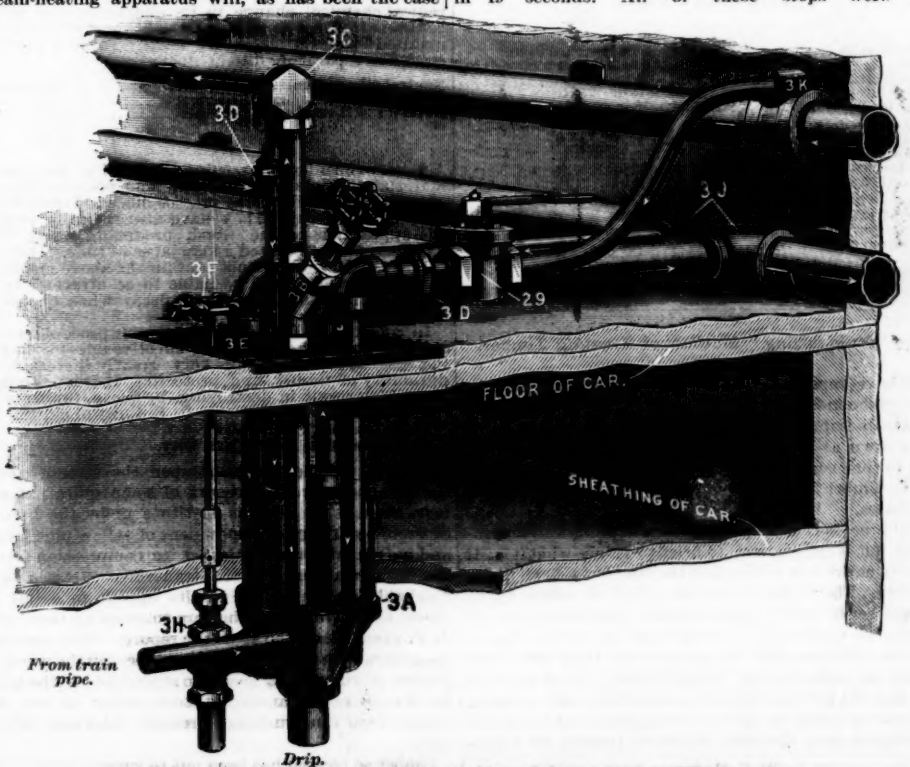
The New York Air Brake.

We have from time to time recorded the progress of the New York Air Brake Company in the development of a new compressed air brake. It may be well, however, to remind the reader that this company is essentially an Eames organization, the offices, works and principal officers being the same for the two companies.

The New Jersey & New York Railroad has equipped its passenger stock with the new brake, and an exhibition of its performance was given near Hillsdale on the line of that road Aug. 28. A large party of railroad officers invited to see the performance of the brake was taken from New York by special train. The party included representatives of most of the roads centering at New York and several others.

The train consisted of a 16 × 24, 35-ton locomotive, equipped with the Eames driver brake, the Massey duplex pump shown in our issue of Dec. 6, 1889, and the engine equipment of the New York Air Brake Co.; six passenger cars equipped with the New York brake, and two with the Westinghouse. The latter cars were put in the train, one near the front and one near the rear, to show the operation of the two systems in one train. The driver brake and train brakes were actuated together.

The tests consisted of a series of stops, the speeds and distances being estimated. They were made on a descending grade of 30 ft. per mile. The first stop was an emergency at about 35 miles an hour and was made in about 500 ft. in 16 seconds. The second, also an emergency stop at 45 miles an hour, was made in about 575 ft. in 17 seconds. The third and fourth were service stops and the fifth was an emergency stop at about 50 miles an hour. This was made in about 700 ft. and in 19 seconds. All of these stops were no-



COMMINGLER STORAGE SYSTEM—CONSOLIDATED CAR HEATING CO.

(Arrows show direction of flow through piping.)

ticeable for their smoothness. Those who were in the cars scarcely felt the application of the brakes. The train had not been specially prepared for the exhibition, but the cars were taken directly from every-day service. All of the brake beams were of wood and the foundation gear was simply in fair running condition. Under the circumstances, the stops were excellent.

The sixth trial was a breakaway. The train was parted when running about 30 miles an hour. The head section stopped in seven seconds; the last one a little quicker. The distance between the sections when stopped was about two car lengths. Stops seven and eight were made with the conductor's valve, on the return run, and were unexpected by the engine runner. They were made in 16 seconds. As the Westinghouse apparatus did not release as quickly as the New York no particular effort was made to get away quickly after these last stops. The train was under way, however, in about 50 seconds.

On the whole, so far as these tests go, they indicate that the new brake is one to be considered in future by those who have brakes to buy. We are informed that it has given perfect satisfaction on the New Jersey & New York.

The New York Air Brake Co. reports orders for freight equipment from a number of roads, and its shops at Watertown will soon have a capacity of 100 sets of car equipment per day.

Wooden Trestle Bridges.*

BY WOLCOTT C. FOSTER.

FRAMED TRESTLE—OHIO CONNECTING RAILWAY.

The accompanying cuts show the general plans of construction for the framed trestles of the Ohio Connecting Railway, of which road Mr. Max J. Becker is the Chief Engineer.

These trestles belong to that class in which the decks, though entirely distinct from each other, still are intimately connected together, the sill of one deck acting as the cap of the one beneath. The post cannot, of course, be continuous.

There is little to be said in regard to this design further than what has already been said in discussing previous types. In the floor system the absence of jack stringers is at once noticed as well as the short length of both the ties and cap. The track stringers rest upon corbels 10 in. × 15 in. × 5 ft. Two wooden keys or blocks are introduced between the stringers and corbels, being let into each to one-half the thickness of the blocks. The stringers are each composed of two pieces 7 in. × 14 in., packed one inch.

Little is to be said about either the caps, posts or sill, except to call attention to the inclination of the batter posts, which is larger than usual, being 4 in. per ft. This increase in batter adds to the stability of the structure, and hence is to be recommended.

Counter posts are introduced into the second or lower deck. Their inclination, which is in the same direction as that of the batter posts, varies with the height of the deck.

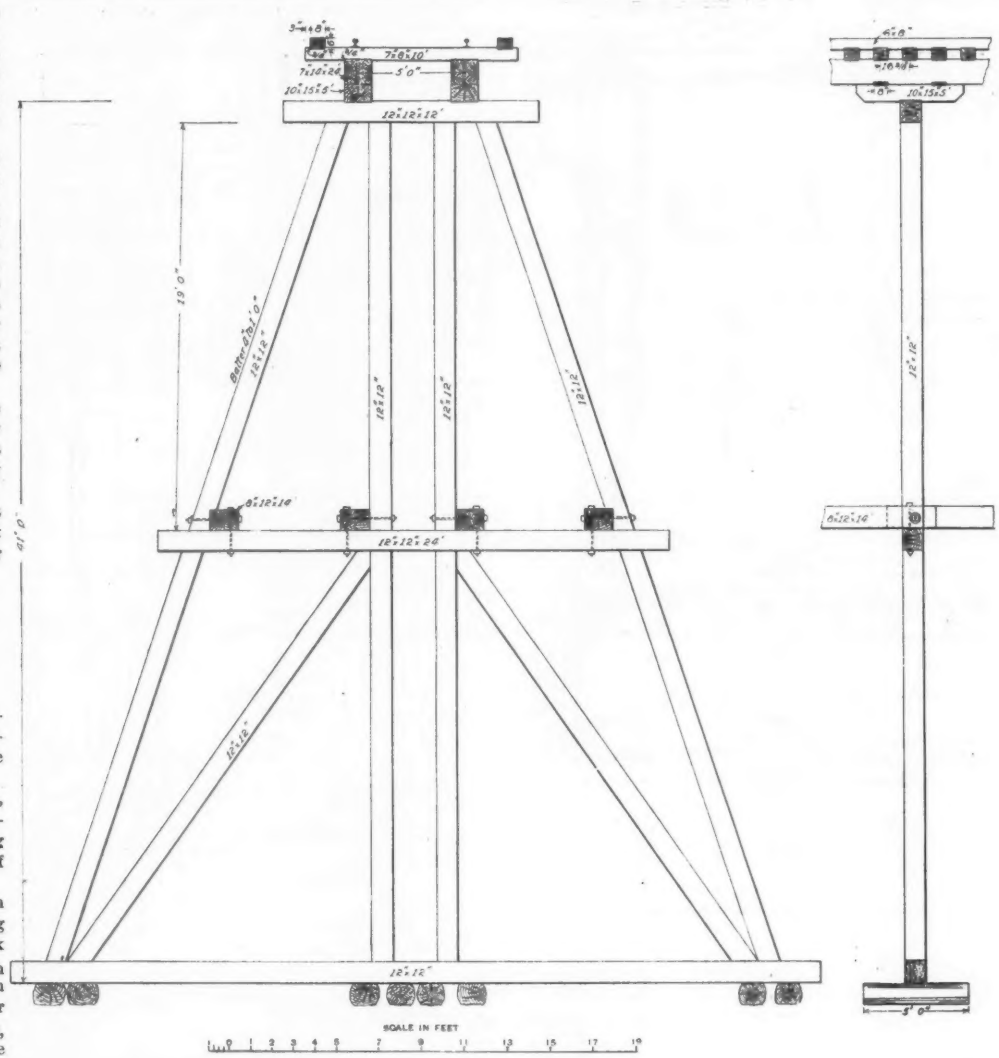
Longitudinal braces are placed just above the intermediate sill. They are of 8 in. × 12 in. × 14 ft. timber and are held in place by ¾-in. iron bolts.

The bents are spaced 12 ft. between centres.

Following is a bill of material for one bent and one bay:

BILL OF MATERIAL.

NAME.	SIZE.
Floor system:	
Guard rails	6 in. × 8 in., notched ¾ in.
Ties	7 in. × 8 in. × 10 ft., notched ¾ in.
Track stringers	7 in. × 14 in. × 24 ft.
Corbels	10 in. × 15 in. × 5 ft.
Key blocks	8 in. × 15 in. × — in.
First or top deck:	
Cap	12 in. × 12 in. × 12 ft.
Plumb posts	12 in. × 12 in. × — ft.
Batter posts	12 in. × 12 in. × — ft.
Intermediate sills	12 in. × 12 in. × 24 ft.
Second or lower deck:	
Plumb posts	12 in. × 12 in. × — ft.
Batter posts	12 in. × 12 in. × — ft.
Counter posts	12 in. × 12 in. × — ft.
Sill	12 in. × 12 in. × — ft.
Longitudinal braces	8 in. × 12 in. × 14 ft.
Sub-sills	5 ft. long.



FRAMED TRESTLE—OHIO CONNECTING RAILWAY.

The "Vulcanizing" Method of Treating Timber.

We have repeatedly in the past given brief descriptions of the method of treating wood for preservation, and for its improvement in various respects, by the process known as vulcanizing, and have also given from time to time some notes of the application of this process to timber for ties and other purposes on railroad structures.

The process is the simplest of all preservative processes; but it may be well to briefly explain what it is. It consists entirely in subjecting the timber to heat under pressure. The timber is run into cylinders about 6½ ft. in diameter by 105 ft. long, in which cylinders are placed steam coils for heating. Compressed air is then forced into the cylinders until the pressure is from 150 to 200 pounds per square inch. Steam is then turned into the coils and the pressure raised to from 250 to 400 degrees. The heat to which the timber is subjected and the pressure depend upon the kind of timber treated, its condition and the results to be obtained. The object of the pressure is to prevent the timber checking, and also to retain the sap in the pores. Under the heat the sap undergoes a chemical change and is hardened, greatly increasing the density of the timber and also increasing its strength, both transversely and under compression. The change which takes place in the sap may be understood from the following letter from Professor Chandler:

School of Mines, Columbia College.
NEW YORK, Feb. 25, 1890.

SIR: I have examined the sample of oak wood preserved by your process, which you placed in my hands.

I find that it is entirely different from the original wood, of which I also examined a sample. The treatment to which the oak has been exposed has effected a radical chemical change in its character, and it now contains 11.91 per cent. of materials, most of which have resulted from the action of heat. These I have succeeded in separating into

Neutral oils, turpentines, etc.	0.36 per cent.
Phenols	0.77 "
Resinous acids and other bodies	10.78 "
	11.91 "

A very considerable portion of this 11.91 per cent. of material consists of antiseptic and preservative substances which will act to protect the wood from decomposition and decay. They have also radically changed the appearance of the wood, producing what would have otherwise required a long lapse of time. The wood before treatment does not contain the above mentioned substances, and would be liable to be attacked by microscopic fungi, and to undergo decay when exposed to air and moisture.

In conclusion, I would say that your process seems to be a remarkably simple and effective one for improving the appearance and very greatly increasing the durability of timber, and protecting it from the agencies which result in destroying, by decay, timber which has not been treated. C. F. CHANDLER, Ph. D.

To Mr. SAMUEL E. HASKIN,
40 Wall street, New York City.

The effect of the treatment upon the strength of the timber appears from a report of some quite extended tests made at the Stevens Institute under the direction of Professor Thurston. Specimens of yellow pine treated and untreated were subjected to compression tests in the Olsen machine and to transverse stresses in the Fairbanks machine. The results appear in detail in a report now before us. They are summed up thus by Mr. A. P. Trautwine, who signs the report: "They establish the general fact that, so far from weakening the wood, the process of vulcanizing seems to strengthen it, the modulus of rupture by transverse stress being 21 per cent. higher and the crushing strength increased 23.6 per cent."

Timber so treated has been put to various uses on the Manhattan elevated railroad of New York, and the results are briefly given in the following letter from Mr. Sloan:

Manhattan Railway Company.
Chief Engineer's Office,
NEW YORK, March 1, 1889.

COL. S. E. HASKIN, ETC.:

DEAR SIR: In reply to your inquiries as to the life of the cross ties and planking which had been treated by the vulcanizing process which we placed on the structure six years ago this month, I have to say the timber is sound and the surface of the ties and planking very hard.

There are no indications of decay at the ends of those planks which were vulcanized, while the planks not treated, and placed on the structure about the same time are decayed at the ends or where they are nailed to the supporting timbers. I am inclined to think the process of vulcanizing will soon be found to be the best way of preserving timber.

ROBT. I. SLOAN, Chief Engineer.

Ties treated by this process have been used to some extent on the New York Central, the New York, New Haven & Hartford, the Erie, and the Union Elevated of Brooklyn. There is no question as to the great increase of their life.

The process is said to be effective also against the ravages of the shipworm. We know of no actual tests made to establish this fact, but it would seem probable that it is a fact.

The density and homogeneousness of the timber so treated and the rich color imparted to it make it highly satisfactory for cabinet work and interior finish, to which purposes it has been very extensively applied. It has also been quite largely used in pianos. The process is rapid, the timber being treated in from 10 to 24 hours, at the end of which time it is in such condition that it is impervious to moisture and proof against the agencies which cause decay. Lumber treated by this process has been extensively used by some of the largest builders of New York, and in some of the finest of the recent buildings. Testimonials from those who have used it for such purposes speak of it as being highly satisfactory in every way, while the experience of the elevated railroads of New York City, as given in the letter quoted above, is sufficiently favorable to warrant a thorough trial of the method on surface railroads. The process is controlled by the Haskin Wood Vulcanizing Co., office 42 Wall street, New York City.

The Fisher Track Jack.

We illustrate herewith the Fisher duplex jack, which was patented by Mr. Clark Fisher, of Trenton, N. J., in 1884. It has not come into general use, though the fact that it has not been "pushed" may perhaps largely account for this. The most obvious practical objection to it is its

* Copyright 1890, by W. C. Foster, and condensed from his forthcoming book upon the same subject.

slow movement as compared with other forms of jack; but its one great merit, that it can safely be left in position during the passage of a train, makes it of special interest in connection with the recent disaster at

Quincy, Mass. The bed plate, 6 × 15 in., is made of a wrought iron channel; the screw is also of wrought iron, and the two struts and saddle are of cast steel. The whole machine occupies a space of only 6 in. wide and 7 in. high, and it weighs but 40 lbs. This jack was described in the *Railroad Gazette*, Aug. 1, 1884.

Thirty-Ninth Annual Meeting of the American Association for the Advancement of Science.

The thirty-ninth annual meeting of the American Association for the Advancement of Science was held at Indianapolis Aug. 20-26. Prof. George L. Goodale, of Cambridge, President, in the chair. The number of members present was less than usual, owing to the apprehension of a railroad strike and to expectation of hot weather. The weather proved a most agreeable surprise, overcoats having been in demand.

Many interesting and important papers were presented. The first day was devoted to addresses from the eight vice-presidents in the afternoon, and to the address of the retiring president, Prof. T. C. Mendenhall, in the evening. The only address of special interest to our readers was that of Prof. J. E. Denton, on Mechanical Tests of Lubricants.

Several hundred papers were read by members in the several sections. Section D, "Mechanical Science and Engineering," had a better supply of material than usual. The reading of papers was followed by a banquet at the hotel. Abstracts of some of the papers follow. The first is Professor Denton's address on

THE HISTORY OF ATTEMPTS TO DETERMINE THE RELATIVE VALUE OF LUBRICANTS BY MECHANICAL TESTS.

Oil testing machines are now being resorted to by large consumers of oil as a means of discriminating between the lubricating value of the multitude of oils offered by manufacturers, which, while practically alike in fluidity and general oily qualities, are nevertheless claimed to differ in their respective abilities to afford satisfactory lubrication.

The only difference of behavior of all these lubricating oils shown by the oil testing machines is simply such differences of frictional resistance as are ascribable to the variation in viscosity of the substances in the fluid condition, and this difference of friction fails to account for the well-attested fact that some of the oils are unable to prevent excessive heating and cutting on heavy machinery bearings, which exhibit no such action when lubricated with other oils.

Experiments were described which have been made with special apparatus constructed for the Lubricating Committee of the Standard Oil Co., proving that the overheating of bearings is due to accidental abrasion of the rubbing surfaces, due to the gradual and inevitable variations of the smoothness of these surfaces by metallic wear. This abrasion generates a comparatively intense heat at some point of the bearings, and tends to vaporize some oils more than others. Oils which are incapable of resisting excessive vaporization by such accidental heating are those which permit bearings to more frequently overheat than do others not so affected by the heat.

The prevailing oil testing machines fail to reveal such differences in oils:

1. Because they have invariably been operated with artificially smooth surfaces.

2. Because whenever accidental abrasion takes place observations are suspended until the heating tendency due to abrasion has been eliminated.

3. Because the oil supply to the testing journals is artificially abundant instead of being restricted by feeding through practical forms of oil cups. Thereby accidental deficiencies of supply which are frequently the initial cause of abrasion and overheating are eliminated, and differences among oils depending on their ability to feed more or less uniformly by virtue of capillary action cannot be noted.

It is therefore concluded that, in order to enable mechanical oil tests to reveal the actual differences of lubricating value among current lubricants, each oil must be tested with a series of conditions of the rubbing surfaces and practical feeding devices which involve opportunities for abrasion and overheating.

A paper was read by Prof. Denton, of which an abstract follows, on the

USE OF LOCOMOTIVE FOR TESTING CYLINDER OIL.

The frictional resistance of an unbalanced slide valve in a standard-sized locomotive, when satisfactorily lubricated, may be about 500 lbs. A component of this force acts upon the reversing lever. If the latter be held by hand, the engineer can feel the increase of friction of the valve due to the extra steam pressure in the steam closet necessary to maintain a given speed with four passenger cars compared to three cars. The reverse lever is therefore available to test the relative friction of oils.

By gradually diminishing the amount of oil supplied to the cylinders until some considerable effort is necessary to hold the reverse lever still by hand, and then trying different oils, a practical comparison of the friction-reducing value of cylinder lubricating oils is available.

The following results were obtained by the writer, and are presented to show what may be expected from good cylinder lubricants by the above method of procedure. The figures all relate to one oil, but probably a similar mileage could be obtained from other good oils, as the increase of resistance to holding the reverse lever was not impractically greater at these mileages.

RESULTS WITH SIGHT FEED DETROIT LUBRICATOR ON STANDARD LOCOMOTIVE, 18 × 24 IN.

Date	June 10.	June 12.	June 13.
Train	3 to 4 cars.	3 cars.	4 cars.
Distance	205 miles.	206 miles.	206 miles.
Average steam pressure	135 lbs.	135 lbs.	135 lbs.
Lubricator	Detroit.	Detroit.	Detroit.
Miles run per pint.	440 miles.	515 miles.	380 miles.

Another paper given below in abstract was

EFFICIENCY OF THE LOCOMOTIVE LINK VALVE GEAR COMPARED TO THAT OF THE MODERN AUTOMATIC HIGH SPEED ENGINE, BY H. P. JONES, OF PORTSMOUTH, N. H.

The author has constructed curves having for their abscissæ percentages of stroke and for their ordinates percentages of the total area of value opening belonging respectively to the standard type of locomotive link motion and to the Ball automatic cut-off engine at various cut-offs. These curves enabled tables to be prepared from which it appears that the automatic engine renders a larger proportion of the port area available than does the locomotive. For example, the automatic cut-off engine at 30 per cent. cut-off permits 43 per cent. of its total port area to be used, whereas only 27 per cent. is available in the case of the link motion.

It is a natural inference that such difference of valve opening would cause considerable difference in the amount of wire drawing or distortion during admission, as shown by indicator cards.

Examination of indicator cards from the two types of engine shows, however, that such is not the case, since for equal piston speeds and proportion of port area to piston area the locomotive gear gives indicator cards quite as perfect as the automatic gear. The well known distortion or inclination of the admission line of locomotive cards appears at piston speeds which require a mean velocity of flow of the entering steam above 250 ft. per second, which, while frequently demanded in a locomotive, never exists in stationary engines, which present more perfect indicator cards. It was further shown by discussion of indicator cards presented that, while the most perfect cards were afforded by "trip motion," cut-off gears like the Corliss, the following conclusions practically apply to all good valves, including

The locomotive link motion. The automatic cut-off, or high speed engine. The Meyer cut-off, and the Corliss cut-off.

1. To avoid more than 1 lb. loss of pressure between the steam chest pressure and during admission to the cylinder, the mean velocity of flow of the steam through the ports during admission must not exceed 40 ft. per second.

2. The admission line remains parallel to the atmospheric line up to a mean velocity of flow of about 250 ft. per second, notwithstanding that the loss of pressure between steam chest and cylinder may be upwards of 25 lbs. per square inch.

3. Distortion or inclination of the admission line occurs above 250 ft. velocity of flow, and in locomotives of 55 miles per hour the velocity of flow is upwards of 400 ft. per second.

Hence the loss of pressure between the beginning and end of the admission line is upwards of 25 lbs. in this type of engine.

A long paper was read by Dr. C. A. Oliver, of Philadelphia, on

TESTS FOR THE DETECTION AND DETERMINATION OF COLOR BLINDNESS, DESIGNED FOR USE IN RAILROAD SERVICE.

An abstract follows:

As it is a well-known fact, both from theoretical and practical standpoints, that many "color blinds," especially those of medium grades, have the power of differentiation, even by daylight, of the most difficult colors, when placed at the ordinary one-metre distance of wool selection employed in the detection and determination of color blindness, the writer has been induced to combine two modifications of his method of color selection to a simplified plan of the former procedure by which the candidate is placed in the actual position of after work and under exactly similar circumstances as during employment.

To effect this in railroad service, the method is divided into three parts:

First: The selection and registry of a definite number of loose wools from twenty-three pure and confusion match skeins thrown upon a dead black surface at one metre distance.

Second: The selection and registry of the same number of similar reflected colors under various intensities of diffuse daylight stimulus, placed at distances requisite for safety.

Third: The selection and registry of transmitted color under various intensities of artificial light stimulus, placed at distances requisite for safety.

The first part of the test is conducted by a modification of the ordinary Holmgren method.

For the second test the fixed apparatus can be placed anywhere upon the railroad grounds. The wooden frames containing the match colors of bunting are to be placed in the lower tier of boxes, in any order whatsoever. The five test colors of bunting in the wooden frames are to be slid into the slots in the partition of the large upper box, and the "V" (pure green) area is to be wheeled into position. The candidate is now asked to designate, by writing the number upon a blank used for the purpose, which color in the lower row (going from his left to his right) is the nearest match to the upper color. This experiment is to be repeated by each test color, preferably, but not necessarily, pursuing the order of choice spoken of in the first test, until all have been obtained. These blanks are then to be handed to the examiner, who, after having obtained the names of the numbers chosen for the occasion by the attendant, places them in the second row of the registry blank. To obtain different percentages of light stimulus, and to simulate as near as possible changes in character of weather, variously tinted glasses can be placed in the spectacle frame.

The third test is to be conducted in precisely the same manner as the second, except that here the procedure will be made during darkness and by the substitution of the plates of transmitted color, and the lanterns for the areas of bunting.

An experimental track, with five open switches about a thousand feet away from the apparatus, so arranged that the sidings would pass directly beneath the colors, would be useful after the regular examination had been completed, thus practically testing color vision from locomotives running at full speed, and deciding the ability to differentiate the ordinary white, red, and green signals at safe distances by the choice of track taken.

The method may be said to have the following advantages:

Much faster in time than any other proper method.

Selection of loose colors at a distance.

No necessity for an expert except in doubtful cases. Every color-blind candidate writes his individual verdict. The examiner at the station sends the properly filled blanks with his remarks to the superintendent of the division, who marks the case "approved" or "not approved," obtaining, if necessary, in doubtful cases, the expert report before signing whether passed or not.

Employment of the same character of signal for testing as is used in daily routine.

Placing the eye during testing at a distance necessary for future safety. This is one of the great claims for the adoption of the method, because by it we thoroughly avoid all dangers that might arise from the escape and employment of a class of subjects possessing what Wilson has so aptly termed "chronic myopia."

Bringing the eye, during testing, directly before the true condition of weather experienced while it is upon duty. The color sense is studied in the same place and under the same circumstances as it has given to it while it is in actual service. This is most decidedly a great gain. Moreover, as has been shown, it can even be made to give the best character of detection in those cases and in those situations where it is most needed, such as engineers and assistants placed upon running trains that are rapidly approaching fixed distant signals.

Grade Crossings in England.

The very common impression that there are few or no grade crossings in England is one very easily made upon an American, whose journeyings in England are, as they so often are, confined to the run between Liverpool and Dover, and even those who have extended their travels may very easily have failed to see many grade crossings, for they are in reality few in number, and even then chiefly confined to cross roads or country lanes, excepting in one division of the country—the Eastern Counties. The district more especially affected by grade crossings is that lying to the east of a line drawn from London to Peterboro', thence to Doncaster, and including the county of Lincoln and the level fen country generally.

In this level country there are numerous grade crossings, those on all main roads at least being protected by two pairs of strong gates, shutting at will across the railroad or the road, by the gate keeper, who lives at a house built directly at the crossing, whose sole duty is to attend to the gates, and, it may be added, to come down frequently at and after midnight in a state of dishabille and blasphemy to open the gates to let people through; the rule being that the gates at night are shut across the road. In a winding country road where an evening's drive of seven or ten miles may include five or six crossings of a piece of straight railway this adds to the fun of an evening ride if one is not in a hurry, but is not pleasant in the rain. The country is so level that other than grade crossings are out of the question, the line of railroad being merely raised about a couple of feet above the general level as a safeguard against floods, and being flanked by borrow pits from which the material has been taken, such pits being below the drain level of the country, and full of sedges, and great haunts of water fowl. Apart from this district grade crossings are, however, comparatively speaking, rare, especially near large towns, into and through which it is usual to run either on brick viaducts over the house tops, as at Manchester, Leeds, Newcastle, London, or below the street level, as at London, Birmingham, Liverpool or Bolton.

At Liverpool, which is built on a hill side, the railroads approach by tunnels, which open out into stations in the open air, the tunnels going through the ridge into open country beyond. Such was the original approach of the old Manchester & Liverpool Railroad through a tunnel of one and one-half miles under the city. This tunnel is now opened up into a deep cutting.

Level crossings as they are termed in England are thus very infrequent near large towns. There was a bad one at Burton on Trent near the station a few years ago. This has been removed, the road now going above the railroad by a bridge and two inclines.

At Lincoln the railroad crosses the main road in the city by a grade crossing, and I believe at Boston, if my memory serves me right, but there are not many at busy places outside the Eastern Counties. W. H. B.

The Webb & Thompson Staff Apparatus.

The Webb & Thompson interlocking apparatus for train staffs, described in the *Railroad Gazette* of Aug. 1, is soon to be put in use on joint lines operated by the London & Northwestern and Midland, L. & N. W. and Rhymney, and L. & N. W. and Great Western roads. The shops at Crewe are now engaged upon the manufacture of a large number of instruments, the intention being to introduce them on all the single lines of the London & Northwestern. A modification has been introduced by which these instruments for giving the right of road, by means of a staff, are placed at stations where trains can meet, while at the same time intermediate stations or signal cabins where there are no side tracks are equipped with the ordinary bell signals for blocking apart trains moving in the same direction. The staff apparatus thus provides a block system for opposing trains, while permitting the running of trains in the same direction as near together as may be found desirable.

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The road tests of brake shoes by the committee appointed by the M. C. B. Association have been postponed until October of this year. This is a wise step, as much has been developed by the preliminary tests which requires careful and deliberate consideration. Hasty decision in regard to the relative merits of the various forms of shoes would undoubtedly result in undeserved and serious damage to some of the brake shoe makers, because an ideal brake shoe must fulfill several conflicting conditions, and it is easy to see, therefore, that some of the shoes that would be ruled out by reason of an arbitrary requirement might yet be sufficiently good to warrant continued use under peculiar conditions. The wear, first cost, value as scrap, delays caused by renewals, and the effect on wheel treads are each to be given due consideration; hence the deliberate action of the committee is commendable, and we may hope for a recommendation that will be satisfactory to all. Meanwhile, those who have previously shown an interest in this subject ought not to allow it to lag, but, if they are intending to enter shoes for competition, should reconsider the class of material which they propose to furnish in order that advantage may be taken of experience gained since the shop tests were made.

The committee appointed by the American Society of Mechanical Engineers to report upon a standard method of testing locomotives held a preliminary meeting in Philadelphia this week. The labors of this committee will be arduous, and it was a wise choice that made it consist of seven members, because it will permit a subdivision of the investigation. This body has been changed considerably since it was appointed, and Mr. William Forsyth, Mechanical Engineer of the Burlington road, is now chairman. From such a body of men we may expect the very best class of work, and the recommendation of a system of standards which will be sufficiently comprehensive to include all the essential features of locomotive operation, and yet be so simple and inexpensive as to be within the limit of expenditure that the average road will be willing to make for the purpose. Further than this, we may also expect that the committee will recommend the courses to be pursued in case it is desirable to test a locomotive more completely and scientifically than will be embodied in the standards proposed. Unquestionably, if the report of this committee is made with a view to including a consideration of the conditions of foreign railroads, there will be a probability of the American standards becoming international, as they should be, and then there will be a basis for a decisive comparison of the English with American locomotive, such as is now impossible.

A condensed report of the testimony showing the causes of the Quincy derailment is given in another column. The first and most obvious inquiry in connection with the lessons of this deplorable disaster is that concerning the rule about guarding against trains when repairing track. It is universally agreed that this rule should be, essentially, to put out a signal which will *stop* any train that may approach, and to do this whenever anything is done that renders the track in any degree unsafe for fast trains. But it is difficult to draw the precise line between what is dangerous to the train and what not. And besides this, on most roads there is further complication arising from the treatment of extras with less respect than is accorded regular trains. While a section master must at all times be prepared for a train, he is required to protect himself more thoroughly when a regular train is known to be due, extras sent out without notice being instructed to run more or less cautiously at obscure places. But whatever the degree of protection decided upon, every section master is required to call in his signal and clear the track (make it safe) when a regular passenger train is due; so that the only question in this case is, What can safely be done without flagging the train? A hand car on the track two minutes before a fast train is due will be universally admitted to be dangerous; a sleeper with one end lying on the rail, if under the control of two men with picks, would probably *not* be regarded as dangerous; and yet the hand car could be taken off as quickly as a track jack, while on the other hand the men with the sleeper might meet with difficulties which would delay them so as to make that operation as dangerous as the others. No one will claim that all track work should be suspended ten minutes before each train is due, and we must therefore leave it to the section master to decide how long before a train is upon him he will clear the track. We have gone thus into particulars on the general subject, because section masters often allow too narrow a margin for safety even on tangents. Whether the line be straight or curved, the section master himself needs to have clear ideas in his mind, without regard to whether it be or be not possible to formulate in the book a rule to cover every case. At Quincy the section master should have had a man or men stationed around the curve to notify him when a train approached; or, if he was required to guard only against regular trains, he had the choice between doing this and stopping work ten minutes before the passenger train was due; but the latter is a wasteful rule, because a train an hour late would necessitate 70 minutes of idleness. It will be readily seen that a sharp curve might necessitate stringing three or more watchmen along the track, in order to give a sufficient verbal warning. Doubtless this man depended somewhat on hearing the approaching train, but he forgot to consider—what is perfectly obvious—that if dependence is placed on hearing, it becomes necessary, on the passing of a train on the other track, or the occurrence of a noise from any source, to take off all track jacks or other possible obstructions and have every man face in the direction from which a train is liable to come.

The difficulty of formulating a rule which shall cover all contingencies and yet be readily remembered is at once apparent. The average section master will either waste time by stopping work too early or will spend too many men's time in flagging, or will run too great a risk of derailing trains. Mr. Clark Fisher seems to have clearly seen this six years ago, and he devised the Fisher jack, which was described in the *Railroad Gazette* in 1884. We reproduce the illustration of this jack on another page of this issue. Mr. Fisher found little favor for his jack, because it was somewhat slow; and it has not come into use. Fortunately six years passed without any great calamity to call attention to his device; but now that such a calamity has come we may expect that it will get more attention than it has yet received. As the results of extensive experience are lacking, it cannot be said just how strongly the use of this jack ought to be urged; and we have no doubt that some officers will conclude that the Quincy disaster teaches us to go back to the uneconomical hand lever, with an Irishman to sit upon it. Moreover, it is quite apparent from the evidence in the case that the Barrett jack, which caused the derailment, was not properly used. Had it been it could have been released almost instantly; and so used, it gives all reasonable security. So after all the chief question is one of men and not of tools.

In speaking of the Quincy derailment two weeks ago we said that intelligent discussion would be possible only with a knowledge of all the facts. One fact still lacking (but which the Commissioners' report will probably make public) is the character and training of the section master. We have seen that to use a track jack and make economical use of his men's time a section master must be anything but a dull-minded man; and yet every road master knows that some of the most successful track workmen are poorly qualified for any office requiring quick perceptions, and that, in view of the limited salaries he can pay and the necessity of securing a man who can keep the track in good condition and get good work out of $1.10 men, he is often tempted to engage just such dull men. This temptation has been many times yielded to, and we fear this will be found to have been the case on the Old Colony. In the case of a locomotive runner, railroad officers readily admit that the need is not merely of a man who passes examination and shows no obvious defect of mind or training, but that the man's temperament or nervous organization is an important factor. In a word, that he must not only be properly trained and possess the requisite experience, but must have been *born* with the right mental characteristics. There is no escape from the conclusion that the same traits are needed in a section master. That the Quincy section master was constitutionally dull is strongly indicated by the fact that he risked his men's lives as well as endangered the train. His conduct would have been reprehensible in the extreme, even if there had been no jack on the track. It is true that most men like to run risks, and that a laborer standing on the track would not generally derail a train; but a section master is bound to fully protect his men, even if they are not intelligent enough to demand it, or are foolhardy; and, in case of doubt, he should get them off the track too soon rather than too late. Public sentiment, as voiced in the newspapers, usually questions, in a case like this, whether railroad management, generally, is not slack, and that query has been marked in this case. As the Old Colony officers stand high among their neighbors this line of reasoning is not unwarranted, and the Massachusetts Commissioners may fairly investigate the quality of men employed by all the railroads of the state to supervise track work. We should not wonder if they would think it best to recommend that a higher standard be followed in the selection and training of all trackmen.

A Lesson of the Strike.

The inquiry of the New York State Board of Mediation and Arbitration into the recent strike on the New York Central has revealed some amusing examples of Powderly's strategy, and has let the public into some of the secrets of the "Knights." People will laugh at his plans to make capital in 1892 out of Mr. Depew's presidential ambition, or out of the World's Fair in 1893, but probably no one trembles at the peril escaped, for Mr. Powderly's gigantic schemes grow less terrible the better he is known. The inquiry has been important chiefly as showing something of the character of the men who led the strikers into their trouble, and of their plans and motives. The testimony of these leaders and the letters put in evidence should be carefully read not only by employers but by employés. Indeed, it is the latter class whom they most interest and who can get most good from reading them.

A great railroad strike, whether successful or not, is a serious matter for stockholders and for the general public, but for the men who go out and to those who help them it is far more serious. To them the loss of earnings paid in assessments, of wages while idle, and the loss of their positions mean not merely inconvenience but the sacrifice of livelihood. When they strike they take the risk of losing not luxuries, but the common necessities of life. To them therefore it is vital to know the men who are leading them into a strike.

We heard the other day a characteristic little story of the New York Central strike. A freight conductor on that road was discharged some years ago for a grave failure in duty. After some time he was given a position as freight brakeman, in which he worked eight years with the hope of reinstating himself. Shortly before the strike he was promoted to be a conductor. He joined the Knights of Labor and went out with the strikers. He has lost the position for which he patiently worked so long, and to-day is out of a job and probably out of the Knights also. His story could of course be matched by many others.

It is wonderful that intelligent men should continue to put their fortunes in the hands of men like the typical "labor leader." Undoubtedly men who work for wages will continue for years to come to seek to better their condition by organizing into "brotherhoods" and the like. Probably it is desirable that they should, and probably they will in the end gain by it; but labor organizations, like any other organizations, can only be successful when they are managed by honest and judicious men. At best they are bad for the best men; at the worst they are bad for all.

They tend to keep all at a common level and to cripple individual effort. In the long run the men of most brains and best character will get ahead of the average run of the men with whom they start; but they are hampered by any of the existing organizations, and all are subject to sudden and great loss from most of the organizations as now conducted. By experience, and through defeat and consequent privation and suffering, the men will learn gradually to put their affairs into the hands of competent and honest leaders, and to hold those leaders to strict accountability for the funds which they disburse. The more carefully they study the lessons of each strike the faster will they learn.

It is to this end that we call their particular attention to the testimony taken by the Board of Arbitration and to the Powderly-Lee correspondence. By study of this evidence they will see that Lee is as cheeky as a sparrow, full of foolish vanity, and too reckless to be entrusted with the command of a canal boat. On his own showing he was guilty of insolence toward his officers which could not be tolerated if discipline was to be kept up. With the fortunes of two or three thousand men in his hands, he thought it was "smart" to "cheek" his General Manager, and related on the stand his boyish talk with a self-satisfaction which would have been amusing if the consequences had not been so serious to the poor fellows whom he led out into the wilderness. It is pathetic to think of the men putting themselves into the hands of such a person. Compared with Lee, Powderly shines as a statesman. Mr. Powderly writes:

> Allow no rash counsels to sway you in anything, and do not place headstrong or intemperate men on any committee. The men on the Reading Railroad actually controlled the entire management, and had everything their own way. They grew restive, and allowed incendiary counsels to prevail. It was no uncommon thing for them to stop a train on the main track and talk to an up train in order to settle some little matter. That sort of thing could not last, and when they finally struck it was at the wrong time for the men and just the time to suit the company. You all know the result of that contest. . . . You will acknowledge that there are not ten men along the whole line organized who can maintain themselves for two months without assistance. You must acknowledge, if experience is worth anything, that the strike that is not won in ten days is lost. . . . We cannot assist you in the coming struggle, for the workmen of this age will not respond to assessments to support a strike, no matter how just it is, and for that reason we could only look on and watch the battle. . . . Brother Lee, it is madness for the men of the New York Central to think of striking. They cannot win, and you know it as well as I do. Only the enthusiastic who will never count the cost will say that a strike on a system of railways can succeed in these days.

In spite of this wise advice the strike was ordered, but we cannot say that we "all know the result." We can only try to imagine the amount of care and trouble and real suffering which has been brought into hundreds of homes by the vain desire of a few foolish "leaders" to show their power. We will go no further. It is not necessary to take any notice here of the suggestions that are often made that the leaders manipulate strikes for speculation, and that they appropriate to their personal uses money raised by assessments. These things are quite possible, and it is not likely that a professional agitator is above the temptations which beset ordinary humanity; but we wish to merely call attention here to such facts as have been told by the leaders themselves; the lessons of those facts the men will not fail to learn, and the sooner the better.

Lateral Motion Trucks, their Vertical Movements and Lateral Resistances.

III.

In the last two issues of the *Railroad Gazette* the rise of lateral motion trucks and the pressure resulting therefrom were considered. The following gives some of the individual characteristics of the different designs of such trucks and a few of the conclusions that may be drawn from the arguments presented:

Just which one of these designs is best to produce this result, it is difficult to point out. Both the Pennsylvania type and the inclined links with flat centre pins give a decided initial lateral resistance; but there is an objection to the diverging links, which is that, when the initial resistance is made considerable, the lateral resistance rapidly increases after a small amount of displacement. For instance, take the case in point. With the initial resistance shown at *O M*, fig. 3, it is seen that there is a great increase in lateral pressure after the sixth division, which is 3 in. from the centre. If, as in the case of a locomotive with long wheel bases on sharp turnouts and with elevated road engines on sharp curves, it should be desired to have 5 in. lateral displacement, then there would be an enormous increase of side pressure, which might be sufficient to cause the truck to climb over the rail.

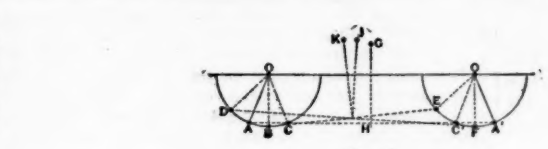


Fig. 4.

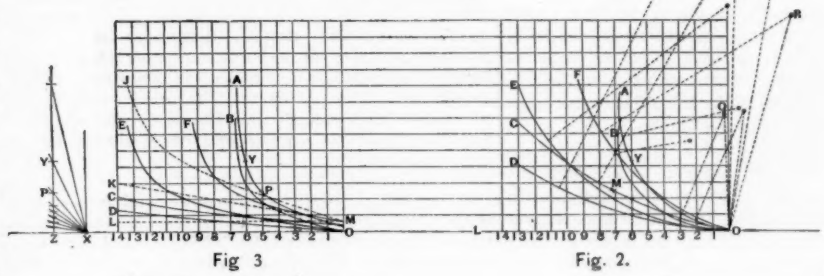


Fig 3 Fig. 2.

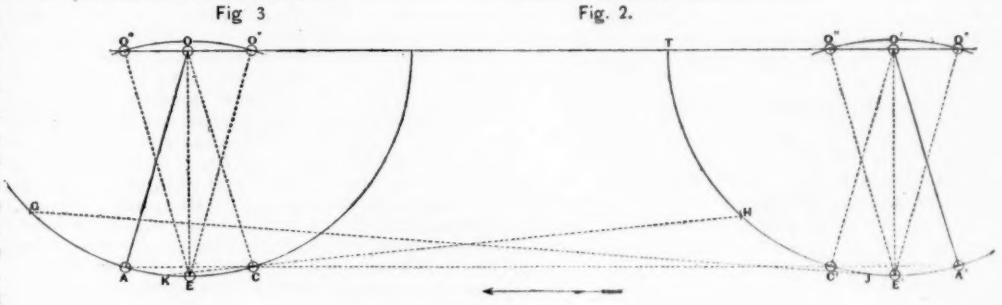


Fig. 1.

A good effect is produced by using the parallel swinging links and springs. With such an arrangement the initial resistance can be made anything that may be desired, and the increase in lateral pressure with the increase of displacement can be governed within very satisfactory limits. Also a large amount of lateral motion can be obtained without in any way affecting the initial resistance.

But whatever may in the end be determined as being the most satisfactory method of hanging a swinging truck for a locomotive, there is yet in the preceding a sufficient proof that a swing truck is *not* always a swing truck, and that in cases requiring a large amount of lateral motion some designs of swinging truck may not have sufficient flexibility to be better than a rigid truck, and it is quite evident that it does make a difference which way the truck is hung. In every instance of a new design the swinging truck on a mogul or a 10-wheeler, or any other locomotive for that matter, should be carefully prepared for the road over which it is to be run. If, however, it is found that there is sufficient initial resistance to keep the engine exactly in the centre and sufficient lateral motion within reasonable limits of lateral pressure to enable the locomotive to pass sharper curves than those on a given road, there is no difficulty. The point to be looked after is that when such locomotives have to take a siding at a considerable speed the lateral pressure will not become so great as to induce the truck wheels to ride over the rail.

The curves here given can be expressed by mathematical formulæ, and when plotted from such formulæ they will be the same as shown in the illustrations herewith; but owing to the complexity of the calculations, the method herewith is recommended in preference, the labor necessary to lay out the rise and resistance curves for a given type of truck being very small.

There are, of course, other features of a swing truck that have not been herein considered, and in the case of the mogul truck there is one point which should be mentioned, even if not analyzed. It is with reference to the location of the radius bar pins in order to increase the lateral pressure. It is customary with some designers to move the radius bar pin ahead of the position which would maintain the axle of the truck normal to the curve. This is done with the avowed purpose of throwing the outside wheel on a curve ahead, expecting thus to produce a tendency in the truck to crowd to the inside of the curve and thereby to pull with it the front end of the locomotive. The probability of this being accomplished in any particular design is a matter for future consideration and one well worthy the time and trouble to investigate, because such action has a detrimental side, as it causes the flanges of the truck to grind against the rail under certain conditions.

As a conclusion to the foregoing the results of the analysis show:

First. That the greatest freedom of movement is obtained by the roller on the inclined plane, the converging links, the radial axle box with springs, the parallel spring links without springs and the parallel swing links with springs, in the order in which they are mentioned.

Second. The greatest initial pressure, with a considerable lateral movement, is obtainable with the roller on the inclined plane, the radial axle box with springs and the parallel swing links with springs, and in these designs the initial pressure is entirely independent of the amount of lateral motion possible, and to a considerable extent independent of the increase in lateral pressure with the increase in displacement. It also should be mentioned that a large amount of initial resistance is obtained with the Pennsylvania type; but the total amount of lateral motion is limited, and depends largely upon the amount of initial resistance required. The greater the initial resistance, the less the total amount of lateral motion.

Third. There is a wide difference in the lateral pressure for a given amount of lateral displacement in the two types of inclined links. It is greater when the links are diverging than when converging.

Fourth. While the total lateral displacement in the case of the parallel swing links is considerable, and the increase in lateral pressure for a given displacement is less than with the links inclined, that is, for small displacements, yet there is no initial resistance, and such an arrangement of links is undesirable unless the initial resistance is given with the spring.

Fifth. The inclined plane with a roller gives a uniform lateral pressure regardless of the displacement and initial resistance, both of which are under control; but a uniform lateral pressure is not desirable, because when the truck is displaced considerably there should be an increased pressure tending to return it to the central position, otherwise when a locomotive with a radial swing truck strikes a curve, the front end will fly off on a tangent, its momentum producing too much lateral displacement, and a decided thump will be felt when the end of the total displacement is reached, which it would be if the engine was moving at a reasonable speed.

Sixth. The radial axle box in its action—we are not now considering its design—has many features to recommend it, the principal of which is that the increase of lateral pressure is directly proportional to the amount of lateral displacement, and the amount of lateral displacement is independent of other features.

Seventh. With parallel links and springs the initial resistance is independent of the increase in resistance due to displacement and independent of the total amount of displacement. It is an excellent method of hanging trucks; the bearings of the centre pins remain parallel, and with it the flat centre pin works more satisfactorily than with other positions of the links unless it be in the case of the Pennsylvania type. It also has the advantage of being adjustable in lateral pressure, as the case is with the radial axle box. By setting up the springs any desired amount of resistance can be obtained. It is an arrangement which answers admirably for experimentation as to the desired amount of lateral initial pressure because of the adjustability

and the large amount of total displacement, as well as the small variation from existing designs.

Eighth. The pivot bearing produces less lateral resistance for a given displacement than the flat bearing, and the spherical bearing occupies a position intermediate between the two depending upon the radius of curvature of the sphere.

Ninth. With diverging links and a pivot bearing there is the least resistance to lateral motion in the central position, and in some cases there is a tendency to fall away from the centre, and therefore cause the truck to run always out of centre with the engine.

Tenth. With converging links and a flat centre bearing there is a decided initial resistance, a wide range of displacement and a reasonable increase in lateral pressure for increased displacement. It is much the best design where inclined links are to be used, and in addition to its desirable action, just mentioned, it gives greater clearance in the truck than the other inclined link types. It has the disadvantage, however, of depending largely upon the flat centre pin for its initial resistance, and in this respect is not as desirable as the Pennsylvania type.

Eleventh. The Pennsylvania type has a good action within the range of displacement. The initial resistance is readily obtained, the increase of lateral pressure with increased displacement is satisfactory, and the centre pin faces remain parallel. If the length of the links, and the location of the top centre are carefully selected, with an eye to the exact amount of lateral displacement required, the results ought to be extremely satisfactory.

Annual Report.

Chesapeake & Ohio.—The report of the Chesapeake & Ohio for the year ending June 30 last is a concise and yet clear presentation of the physical and financial condition of the property.

The net earnings just paid the fixed charges and taxes, but included in operating expenses were about $900,000 of betterments, including passenger coaches, substitution of heavy for light bridges, new stations and an item of $1,000 per mile for work on part of the main track. It is expected that something like this sum will be required for another year.

The fixed charges under the reorganization as well as additions for other purposes, such as branch lines, will also show an increase for another year, but the traffic of the road is now limited only by the facilities, and under the great commercial development now going on in what may broadly be called the Cumberland region there seems a substantial basis for the modest prophecies of the future. But improvements in track, equipment and general facilities must be made, partly, no doubt, from earnings.

No train mileage or similar figures are given. The percentages of increase or decrease do not enable an investigater to tell what the road is really doing.

Branches to coal and stone mines, about 53 miles, are under construction, $2,000,000 of the fund for these extensions yet remaining in the treasury. Gas coal, fine stone, unlimited iron ore will thus be reached, and furnaces are expected. The agreement of lease for the Kanawha & Ohio is delayed and may fall through.

Twelve locomotives, 1,000 box cars, and 500 coal cars have been contracted for, to be paid in installments. Sidings and the like at Ft. Monroe, Richmond, Clifton Forge, Hinton, Upper Creek, Covington and Newport yards, Ohio River ferries and Cincinnati land cost nearly $450,000.

Three bad accidents during the year cost the company $150,000, caused by defects and "cloud-burst." Fifty-two and 56-lb. rails on main line where traffic is heaviest have been removed (left in track by old management) and 75-lb. rails substituted.

A good piece of financiering, worthy of notice by other roads, was done at Clifton Forge. The railroad bought 1,200 acres for $30,000, and, after reserving enough for its purposes, sold the remainder to a syndicate for $250,000, with the proviso that the amount should be expended for shops, station, hotel, etc., at that place. Thus the company's outfit there cost it nothing. The report signed by President M. E. Ingalls concludes thus: "Three years ago the Chesapeake & Ohio was a wreck both financially and physically. The work of the past two years has done much to restore the physical condition. A good deal remains to be done before the property can be operated to the best possible advantage, but a point has now been reached where a large business can be hauled with safety and economy."

The correspondence between Powderly and Lee which has been brought out by the New York Board of Arbitration will probably not hurt Powderly among his followers, but it will show the rest of the community what a dangerous man he would be if he could. Lee it will probably kill as a "labor leader" of any power. The Knights of Labor will doubtless admire the longheadedness of Powderly, and will learn with awe and admiration of his great plan for a general strike in the Presidential year of 1892 or the World's Fair year of 1893. They will not stop to consider how much of that scheme was wind—an element which Mr. Powderly can always command in unlimited quantities.

Very early in the strike Powderly's speeches showed to the attentive reader that he did not believe it would be successful. The publication of this correspondence reveals some of his reasons for doubt and will doubtless help his reputation among his followers as a wise leader. We shall be interested to hear what Mr. Depew has to say of the following passage: "By all means postpone and keep back all indications of trouble until the return of Mr. Depew from Europe. Remember that he is a possible candidate for the Presidency, and will go to any lengths, where his own personality is concerned, rather than have a strike on his road, for that would injure his chance irreparably." Has Powderly with one shot killed Mr. Depew as a presidential candidate and Lee as a rival leader?

All superintendents of motive power and master mechanics should be interested in the tests lately made on the Baltimore & Ohio and the Old Colony and those now in progress on the Union Pacific to determine the actual condition, as regards economical working, of locomotives which have been some time in service. Systematic records are, indeed, already kept by most roads, showing the general condition of locomotives as regards their need of repairs, but, as every one knows, these records are not based on exact data. It is obvious that every 100-mile trip made by an engine leaves it in a less efficient state for economic operation, particularly in cases where bad water has to be used; and these progressive roads do well to improve the records by which the work is to be guided. Attempts to make remarkable records of long service without going to the shop for general repairs may readily be carried to an unprofitable extreme.

Demurrage on the New York Central.

We find in the *Equipment Guide* a copy of the circular issued by the New York Central and West Shore roads on the introduction of "car service" rules at non-competitive stations on those roads, together with samples of the various blanks prepared for the use of agents in conducting this branch of the business. As these regulations have been prepared by Messrs. W. G. Wattson, of the West Shore, and C. H. Ewings, of the New York Central, they are of special interest, these gentlemen being experts and noted for their painstaking methods. We condense from the *Guide* the following account of the system:

The supervision of the work is placed under the immediate charge of the car accountant. Each agent will make a daily report to him of all cars received subject to car service rules, all cars placed for loading or unloading, and of all cars released or reconsigned. The car accountants will check the agents' reports of cars coming under car service rules from their running records based on conductors' reports. The car accountant is given full authority in the matter of adjusting claims for refund of car service charges. If consignees or shippers feel that they have been unjustly charged, it is their privilege to present claim for refund, with a statement of the facts, to the car accountant, who will decide the case upon its merits. If a question concerning the weather or the movement of the car is involved, the records of his office will enable him to reach a decision at once. If it is a question concerning the character of the commodity or the conditions under which the shipment was made, the car accountant can confer with the general freight agent. The car accountant will be entirely free from the consideration of claims for commissions based on the rates of transportation and the volume of business, actual or prospective. The car accountants of these roads are on the immediate staff of the general superintendent.

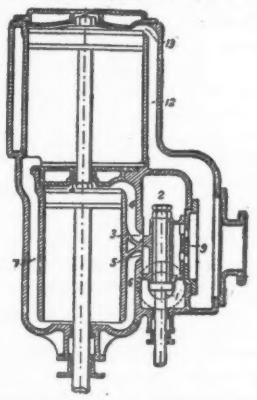
The system of accounting is admirably adapted to the purpose. The collections are not considered as freight earnings, and an account known as "car service account" has been opened. In conducting it the car accountant will bear about the same relation to the controller as the auditors of freight and passenger accounts. All collections on account of car service will be reported by agents (this includes stations under the car service associations) to the accountant, and remitted to the treasurer as a separate item. The treasurer will notify the car accountant through the controller, daily, of the remittances received from each station. The car accountant will be expected to give the amount of the car service balance at any station, at all times, immediately on request of the traveling auditor, when visiting stations for the purpose of checking the agents' accounts, and will give the controller the final figures for each station at the close of the month. When "refunds" are allowed on account of car service collections, a "cash" voucher will be prepared by the car accountant and forwarded to the treasurer for prompt payment. We believe it is customary under most, if not all, of the car service associations previously organized to have the "refunds" paid by the respective agents on the order of the manager of the car service association. We think the plan of paying through the treasurer is practically better, and it also conforms to the rule under which money is disbursed by railroads. The record kept by the car accountant provides a thorough check against each station without the aid of traveling inspectors.

The instructions to station agents are comprised in 19 rules; they are similar in principle to those in force elsewhere, but go more fully into precise details. The circular is too long for reproduction in our columns, but we advise superintendents and car service managers to get copies of it. The merits of the various provisions cannot be discussed here, as the points are very numerous. One of the best features is that which seems to provide for the prompt settlement of all disputes concerning allowances for bad weather. There is a special form of blank to be used by the car accountant in authorizing agents to waive charges on all cars on a stormy day. We are sorry to see that "claims will not be considered unless the receipt for the amount paid is first sent to headquarters." This is one of the petty requirements of railroad red tape which often offend consignees. It will never be easy to make them understand why a railroad company should not know what money it has collected. "The question of notice of arrival of freight will not be taken into consideration in the settlement of claims." This indicates that the roads intend to stand upon their legal rights and not bind themselves to give notice at all. While this right is one which railroads undoubtedly possess, experience has shown that it is one which it is not always well to insist on. At competitive points it has become customary to send notices regularly, and in some cases by wire, and it may perhaps be said that it is only a question of time when this custom will acquire the force of law. The Central and the West Shore are, therefore, apparently treating their consignees at non-competitive stations with less consideration than is accorded those at competitive stations, simply because it is in their power to do so. Perhaps, however, this provision, like some of those in other railroad agreements, is intended to be winked at. Our readers will remember that the rules of the Southern Railway and Steamship Association are based upon the assumption that the railroad company will expressly undertake to notify consignees of the arrival of goods on which it is intended to make a demurrage or storage charge. The rule under which an agent shall refuse to switch *any* cars for a party who has refused to pay charges is also included in this list. As the courts have uniformly decided this to be illegal, and as it is certainly impolitic, if not illegal to hold one shipment for the charges on another, the insertion of this rule seems to be introducing an unnecessary disturbing element.

Morris' Tandem Cylinder for Compound Engines.

"A compound steam engine with tandem cylinders (English patent 11,646, July 22, 1889) is described as follows by *Engineering:*

The steam enters the valve casing 2 by the inlet 1, and is admitted into the high-pressure or small end by the port 3 and passage 4 to the upper side of the piston, and is cut off at any desired point of the stroke of the piston by the valve in the usual way. As the stroke is completed the travel of the valve opens the port 4 to the interior space of the valve, and has closed the exhaust port in plate 9, thus permitting the steam to pass from above or below the high-pressure piston, as the case may be, by port 5 and passage 6 to the other side of the high-pressure piston, making the pressure on both sides of the piston the same, and also to the upper or underside of the low pressure piston, as the case may be, by passage 7 to do the work of the return stroke. The port 5 is always open to the interior of the valve, and the exhaust port in plate 9 is closed by the valve only during the return stroke. During the down stroke the low-pressure portion of the cylinder is open to the exhaust on both sides of the piston, and also the opposite end of the high-pressure portion of the cylinder to that at which the live steam from the boiler is admitted, so that the low-pressure piston is moving in equilibrium, and the effective



pressure of the steam on the high-pressure piston is its absolute pressure, less the pressure of the exhaust. During the return stroke only that end of the low-pressure portion of the cylinder opposite to that at which steam is admitted is open to the exhaust through passage 12 and port into the cylinder 13. The steam used on the down stroke in the high-pressure cylinder enters the other end of this portion of the cylinder by passage 6, consequently the pressure on both sides of the high-pressure piston being the same, this piston is moving in equilibrium, and the effective pressure of the steam on the low-pressure piston is its absolute pressure less the pressure of the exhaust."

TECHNICAL.

Manufacturing and Business.

Blackmer & Post, of St. Louis, sewer and culvert pipe manufacturers, have received an order from Cuba for culvert pipe. Recently they received a large order from a railroad company in San Salvador.

Carnegie, Phipps & Co., of Pittsburgh, have secured the contract for furnishing the Arkansas & Gulf Railroad with 8,000 tons of 56-lb. rails.

The National Railway Forging Co. has been incorporated at Covington, Ky., with a capital stock of $200,000, by H. M. Lewis, of Hamilton County, O., and J. S. Pessenger, of Kings County, N. Y., to manufacture railroad forgings.

The Sterling Emery Wheel Co., manufacturers of emery and corundum wheels and emery grinding machinery, announce the removal of their factory from West Sterling, Mass., to Tiffin, O., where a building 200 ft. × 60 ft. will be occupied. The earthenware business will be continued at West Sterling, and the New York office will remain at 174 Fulton street, as heretofore.

The buildings of the Hercules Iron Works at Aurora, Ill., are finished. The company will soon have the machinery in place. The buildings are composed of brick and stone and comprise a machine shop, foundry and office. They are located near the track of the Chicago, Burlington & Quincy Railroad. The products of these works are steam engines, ice machines, etc.

The Baltimore & Ohio has ordered 1,000 kegs of spikes from the Curved Safety Spike & Rail Joint Co., of Washington, D. C.

The passenger cars now building for the Denver & Rio Grande at the Pullman shops will have Scarritt seats.

The Harvey Steel Car Co., of Chicago, Ill., expects to begin the manufacture of cars by Oct. 1. The buildings at Harvey, a new suburb of Chicago, are in process of erection.

A. C. McEwen, of Jersey City, N. J., builder of railroad contractors' and dump cars, is building a new five-story shop. The dimensions are 50 ft. 6 in. × 100 ft. 6 in.

The Georgia Rolling Stock Co. has been incorporated by H. J. Lamar, J. S. Schofield, J. S. Baxter and others at Macon, Ga., to establish car works. The capital stock is $250,000.

The Pardee, Snyder & Co., Limited, Association, o Watsontown, Pa., has been dissolved and reorganized by Mr. Pardee under the name of the Pardee Car & Machine Works. He will continue the manufacture of freight cars, as well as the general machine business. Mr. S. B. Morgan is manager of the works.

The newly organized Iron Car Equipment Co., of New York, successors of the Iron Car Co., entered a mortgage at Huntingdon, Pa., Sept. 2, for $3,000,998, representing the par value of the stock of the new company. The Huntingdon Manufacturing Co., which failed in consequence of the Iron Car Co.'s failure, has been reorganized and will be operated under the direction of the New York company.

Iron and Steel.

B. A. Jenkins, of Knoxville, Tenn.; J. J. Reed, D. R. Beynon and others have incorporated the Rome Cotton Tie Manufacturing Co., with a capital stock of $50,000, to operate the Rome Rolling Mill, which they recently purchased for $38,500. The plant will be enlarged.

The Stanly Land & Improvement Co. has been incorporated at Stanly, Va., with a capital stock of $2,000,000, to erect an iron furnace, a spiegel furnace and a rolling mill. The company will open mines on the 5,000 acres of mineral land which it owns.

The Norton Iron Works and the Kelly & Belfont Mills, Ironton, O., will erect a steel plant at Ashland, Ky., to cost from $350,000 to $400,000, of which $100,000 has been subscribed by the people in Ashland.

The Lynchburg Iron Co. has been organized at Lynchburg, Va. The capital stock is to be not less than $110,000. E. Burd Grubb is President of the company.

C. N. Parker and H. W. Topping, of St. Paul, Minn., have leased the Union Pacific foundry at Albina, Or., for five years. They operate foundries at Brainerd, Minn., and at Tacoma, Wash., for the Northern Pacific. This firm will now make all the castings for the entire Northern Pacific system and for the Pacific Division of the Union Pacific.

The Embreeville Iron Co., a large English corporation of Embreeville, Tenn., is to build a 19 × 80 ft. blast furnace, the Pittsburgh Iron & Steel Engineering Co. being the contractors. This company will also put up a reversing plate mill for the West Superior Iron & Steel Co., of West Superior, Wis. Rolls 30 in. × 90 in. will be used, and will be driven by a pair of 36 in. × 48 engines.

The Tyler Tube & Iron Pipe Co. will soon start its tube and pipe mill, recently erected at Washington, Pa. The firm will make its own skelp iron, having put in an 18-in. 3-high Garrison roll train for that purpose.

The Shenandoah Furnace Co., of which D. W. Flickwir is President, will build an extensive rolling mill plant at Shenandoah, Va. Frank C. Roberts, of Philadelphia, has been engaged as the engineer of the new works and will prepare plans and specifications, as well as supervise the work, both in the shops and in the field.

The Cambridge Iron & Steel Co., Cambridge, O., has recently equipped a machine shop for the purpose of doing its own repair work, and has also placed a contract for two new 10-ton cranes of improved design.

The annual meeting of the stockholders of the Pittsburgh Forge & Iron Co. was held in Pittsburgh last week. The old board of directors were re-elected as follows: Calvin Wells, James Verner, B. H. Rubie, John H. Dalzell, W. W. Speer and Ogden M. Edwards. The officers elected are as follows: Calvin Wells, President, and James K. Verner, Secretary.

The Boston Iron & Steel Co. has broken ground for its new plant at McKeesport, Pa. The company is composed of E. C. Converse, C. Chandon, Joseph Jackson, and other officials of the National Tube Works Co., who recently purchased the Allikanna Rolling Mill, near Steubenville, O. A portion of the mill will be placed in operation early next spring. It will at first comprise 40 puddling furnaces with squeezers and muck rolls, but will be enlarged by the addition of plate rolls and heating furnaces. It is expected to employ about 500 men.

The Ironton Steel Works Company has purchased the Swift Iron and Steel Works, at Newport, Ky., formerly owned by E. L. Harper, of the defunct Fidelity National Bank. It will be rebuilt and enlarged.

The Rail Market.

Steel Rails.—New York quotations $31 for present delivery; probably lower for winter delivery. Sales of about 10,000 tons reported. Pittsburgh quotations $31.50 @$32.50 at mill. Chicago, $33.60.

Old Rails.—$24.50@$25 for American iron.

Rail Fastenings.—Spikes, $2.05@$2.15; angle splices, $1.90@$1.95; bolts and nuts, $2.95@$3.15, New York quotations.

New Stations and Shops, etc.

The Baltimore & Ohio is to construct a freight depot in Pittsburgh, 115 × 625 ft. The building is to be entirely of iron and glass. Riter & Conley are the contractors.

The Chicago, St. Paul, Minneapolis & Omaha will build a new 20-stall roundhouse at East St. Paul, and will put in several new side-tracks at the yards. The old car shops at Hudson, Wis., will be taken down and new and larger ones erected.

The Baltimore & Ohio will shortly begin the construction of a coal shipping pier at Jackson street wharf, on the Delaware River at Philadelphia. The new pier will be 600 ft. long and 40 ft. wide.

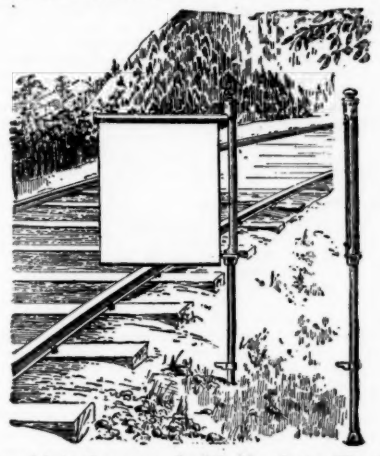
Contracts Let.

A despatch to the New York *Times* says that the contract for the Niagara tunnel has been let to Messrs. Rogers & Clement, of New York. They give bonds for $300,000.

The contract for the dam on the east branch of the Croton River near Carmel, N. Y., has been let to Mr. M. S. Coleman for $397,282.50.

Flag Holder for Trackmen.

Tallman & Co., of Grand Rapids, Mich., have brought out a signal holder, which consists of a galvanized iron case, set on the end of a ¾-in. gas pipe of proper length. The latter is sharpened and has an arm by which it can



be pressed into the ground with the foot. The flag is attached to a horizontal arm, within which it is rolled up when not in use. The arm folds down parallel to the support when the flag is not in use, so that the device takes up little room in a hand car. The flag is firmly held when unfurled so that it cannot be wound around the stick by wind and its value as a signal be thus impaired.

The Manchester Ship Canal.

At a general meeting of the company, Lord Egerton, the chairman, reported the probable completion of the work within the time required by the parliamentary act by the executors of the late Mr. Walker, who are now employing 16,361 men. It is hoped that the canal from Eastham, the sea end, will be sufficiently complete by the end of the year to admit the traffic from the Weaver River to pass through it. "At the Eastham locks seven-tenths of the concrete, six-tenths of the brickwork and three-tenths of the masonry were now nearly finished," as well as the outer gates of one of the locks being nearly finished.

Under the "various powers bill" secured last year, the company is proposing to build connecting railroads to the docks, warehouses and cranes, which that act allows it to construct, and "two of the leading railway companies in the district—the Lancashire & Yorkshire and the Cheshire Lines Committee—had taken powers to put themselves into communication with the company's railways in the docks."

The present filthy state of the Irwell, and consequently of the canal, presents some difficulty, Lord Egerton saying "he was sure all would admit that it would be a suicidal thing for any of the towns concerned to allow the canal, when opened, to be filled with stinking water," and he proposed the enforcement of the "Rivers Pollution Act" in favor of the purity of the canal water; a proposition which led Mr. Mitchell to declare that in that endeavor "nothing must be done to destroy the industries of Manchester."

American Locomotives in Japan.

A short time ago two Baldwin locomotives were shipped to Japan, where they are now being used on the Tokio-Kioto Railroad. These are the first American competitors of the English locomotives, which have hitherto been exclusively used in Japan. They are to share the traffic with some of Nasmyth, Wilson & Co.'s engines over the Hakone Range, where there is a grade of 132 ft. per mile for 10 miles. The cylinders of both types are 16 in. × 22 in., but the steam pressure in the American is 140 lbs., as compared with 160 lbs. in the English. *Industries*, from which we take this item, remarks that "the English engines are superior in finish and general workmanship to the American"; but the proverb about the proof of a pudding being in the eating thereof is not alluded to.

Paper Pulleys.

According to *Le Génie Civil*, a French machine tool builder, M. Burot, of Angoulême, is turning out paper pulleys for power transmission, based on the principle of the paper car wheel. The pulleys have metal hubs and arms on which the soft paper mass is mounted and then compressed. After drying, the paper pulley is treated in a bath of linseed oil and resin to give it greater resistance against the influence of moisture. The pulleys are said to be very light and of low price, and to have given excellent results in practice.

Steam-Heating Plant for Car Shops.

The contract for the steam-heating plant for the new shops of the Northern Pacific at Tacoma, Wash., soon to be built by Geo. C. McMullen & Co., has been awarded to W. F. Porter & Co., of Minneapolis. The steam for both power and heating will be generated at a central plant and distributed from there to the different buildings, some of which will be at a distance of 1,650 ft. This is the largest contract of the kind ever awarded in the Northwest. Over 36 miles of pipe will be used in the plant.

Pennsylvania Railroad Improvement at Walls Station.

The Pennsylvania Railroad is making extensive improvements at Walls Station, 15 miles east of Pittsburgh. The undertaking is designed primarily for handling the freight business which is now done at Pittsburgh, and through trains from the lines west of Pittsburgh will be run to Walls instead of to Pittsburgh, as now. The car repairing shops at Torrens, near the Pittsburgh stock yards, will also be transferred to Walls, the work having far outgrown the capacity of the shops. A car repair shop at Walls has been erected. It is of larger diameter than any heretofore built by the company, but has the same number of stalls heretofore used, viz., 44. There have also been put up a planing mill and a machine shop, a blacksmith shop, oil house, store house and lumber sheds, and quite a large yard has been arranged to serve these sheds Two transfer sheds will also be built, and probably two roundhouses, one for locomotives of the lines west of Pittsburgh and another for those of the lines east of Pittsburgh. The freight yard which has been laid out will be about two miles long. This will be built as fast as circumstances warrant. The exact plans of the yard and for working it have not yet been decided upon.

Efficiency of Stationary Boilers.

The results of some interesting steam boiler experiments made by Mr. Bryan Donkin, Jr., and Professor Kennedy, F.R.S.—published in *Engineering*, Aug. 1—are as follows

PRINCIPAL RESULTS.

Carbon:	
Per cent. weight of carbon to dry gases	5.06 per cent.
Air:	
Pounds of dry air per pound of carbon	19.20 lbs.
" " " coal	17.00 "
" " " pure and dry coal	17.50 "
Pounds of dry furnace gases per pound of pure and dry coal	18.10 "
Ratio of air used to air theoretically required	1.63 "
Temperature of Gases:	
Rise in temperature of gases (from air temperature)	561 deg. Fahr.
Pounds H_2O vapor in gases per pound pure and dry coal	0.925 lbs.
Carbonic Oxide:	
Per cent. of carbon burnt to carbonic oxide	1.97 per cent.
Combustion:	
Pounds of coal burnt per square foot of grate surface per hour	18.50 lbs.
Pounds of coal burnt per square foot of total heating surface	0.48 "
Transmission of Heat:	
Thermal units per square foot of heating surface per hour, boiler only	4,610 T. U.
Evaporation:	
Pounds of water evaporated per pound of coal from feed temperature	8.53 lbs.
Equivalent evaporation per pound of coal from and at 212 degrees Fahr	10.02 "
Equivalent evaporation per pound of coal pure and dry	10.90 "
Equivalent evaporation per square foot of grate per hour	185.50 "
Equivalent evaporation per square foot of total heating surface	4.78 "
Factor of evaporation	1.175 "

BALANCE SHEET.

	Per cent.
Heat evolved:	
Heat from pure and dry coal	100
Total	100
Heat absorbed:	
Heating and evaporating water	67.6
" furnace gases	16.2
Evaporating moisture in coal	0.4
Radiation	6.0
Heat in fire drawn	0.4
Evaporating water under grate	4.6
Lost by imperfect combustion	1.2
Unaccounted for	3 6
Total	100

The general conditions under which these results were reached were:

Experiments, No. II., January, 1887, *and No. III., July* 20, 1888.—Both these experiments were made at the works of Messrs. Bryan Donkin & Co., Bermondsey, on a nearly new Lancashire boiler, regularly used to produce steam for the works. This boiler is 21 ft. long by 7 ft. in diameter, and contains two flues 2 ft. 9 in. in diameter, each fitted with three Galloway tubes. The setting is such that the gases split at the rear end of the boiler, returning toward the front by the side flues, and finally traversing the flue under the boiler on their way to the chimney. The top of the boiler is well covered. The boiler is fitted with Perret's patent grate; and has very thin, deep fire bars, the bottom edges of which rest in water troughs. The boiler is worked with a fan, giving a forced draught, with special arrangements for burning dust coal, coke, and low-class fuels.

The same quality of standard coal was used in both trials, but the quantity of small coal burnt per square foot per hour was purposely considerably varied in the two experiments, as was also the amount of water evaporated. The average steam pressure maintained was also higher during the third than during the second experiment. The furnace gases were sampled and analyzed continuously by a special apparatus fitted with tubes and bulbs for absorbing the moisture and the CO_2, while the oxygen, nitrogen, and carbonic oxide passed on to an aspirator, in which their volumes were measured, and their composition afterward determined. During each trial there was a staff of assistants, and the experiments were quite satisfactory.

THE SCRAP HEAP.

Notes.

One hundred shop employés of the Pittsburgh, Cincinnati & St. Louis at Logansport, Ind., were discharged last Saturday night.

At Easton, Pa., last week a boy was arrested for stealing torpedoes from the rails (of two different railroads) where they had been placed as danger signals.

Officers of the Illinois Central maintain silence regarding Vice-President Harriman's reported resignation. The report is revived that John McNulta is to be made President and E. T. Jeffrey General Manager of the company.

The Cleveland, Cincinnati, Chicago & St. Louis has issued an order to the effect that hereafter neither engines nor cabooses shall be draped in case of the death of any one in the train service. It is said that a number of other roads have taken similar action.

Superintendent E. C. Brown, of the Michigan Central, after a trip to the Northwest, says he has inspected the

working of the 24-hour system, in force on the Canadian Pacific, and has come to the conclusion that it is a complete success in running trains. He has hitherto opposed its adoption on the Michigan Central, but now favors it.

General Manager Wood, of the Pennsylvania lines west of Pittsburgh, gives notice that deserving employés, members of the relief department, who have been sick for over a year and have thus lost their right to receive benefits, will be granted gratuities by the company, after the manner followed by the Pennsylvania lines east of Pittsburgh.

The Grand Trunk has established a record of the firemen employed throughout the system, so that the grading of the men and their chances of promotion shall be equitable, regardless of their location on any division. A number of firemen stationed at points remote from headquarters state that they have heretofore been at a great disadvantage when promotions were made, and they are now correspondingly jubilant.

The conductors on the Georgia Pacific, after considerable negotiation, through a committee, with the officers of the road, have been granted a considerable increase of pay. Passenger men are to get $95 per month instead of $90. Local freight men $3.25 per day, and $3.50 per day on the third division. Work train conductors will be paid $85 per month. Through freight conductors will get $4.35 for a trip between Atlanta and Birmingham and the same for a round trip between Anniston and Birmingham. Twenty-five cents per hour will be allowed for delayed time and one-half pay for deadheading.

Foreign Notes.

The tunneling of the Khojak mountains marks an important step in advance in the project of building a railroad from the lower Indus valley to Kandahar, in Afghanistan. The Khojak tunnel, though not yet completed as regards lining, is one of the longest in the world, having a length of 12,456 ft.

The Turkish minister of public works has submitted to the government a proposal to establish communication between the railroads of European and Asiatic Turkey. It specifies the building of about 370 miles of new road, to be completed within five years. The undertaking will probably be in French hands.

According to *La Semaine des Constructeurs*, the French labor commission recently issued a circular inviting suggestions as to measures to be taken to regulate the length of a working day. Up to July 30, 7,454 responses had been received. Of these 1,850 were averse to any compulsory regulation; 1,767 recommended a day of eight hours; 3,566 recommended leaving the matter in *statu quo*, and 271 were non-committal.

At a recent session of the French Chamber of Deputies a bill was presented calling for the prompt construction of a railroad across the desert of Sahara. The road is to connect Algeria with the city of Timbuctoo and is to have branches east and southeast through the Senegal valley and to Lake Tchad. The road is, in the main, to follow river courses, with the view of reducing the cost of construction, and could, it is thought, be completed in four years. At best the project is a wild one and hardly worth serious consideration.

At the industrial exhibition at Bremen, and also near Berlin, a company have constructed what are termed "air lines," designed for amusement purposes. The line at Berlin is about 125 ft. long, and consists, essentially, of four strong wire cables which connect two towers built on opposite sides of a small, artificial lake. The cables serve as rails for two cars of which the wheels are represented by heavy metal rolls. The cars accommodate about ten passengers each and are propelled by an endless cable, set in motion by two gas engines, one at each station.

The department of Pima, in Northern Peru, has for some time been known as a petroleum district, but the few wells which were put down have not proved commercially successful. More recently, however, the oil lands to the south of Tumbes have shown themselves to be remarkably rich, and a company has been formed with a capital of $1,000,000 to develop them. Eight wells are now being worked, a refinery has been established and a factory has been put up to manufacture the necessary tin cans for saipping the oil. It is understood that six tank steamers also are to be built to make possible cheap transportation to harbors on the west coast, and that the oil is to be used as fuel for the locomotives on the trans-Andes railroad.

The Strikes.

The New York State Board of Mediation and Arbitration (whose members, by the way, are in some doubt whether their terms of office have not expired) held an investigation this week in New York City into the cause of the late strike on the New York Central. Vice-President Webb testified before the board giving substantially the same information that has been heretofore published. He refused to give the details of the arrangement with Mr. Pinkerton for private detectives. A dispatch from Albany on Saturday last stated that some sleepers had been piled upon the track to derail a night express train at West Albany, and that the obstruction had been swept off without damage. An intelligent passenger on the train subsequently stated his belief that the story had no foundation. On the morning of Sept. 1 the locomotive and five cars of a freight were derailed near Poughkeepsie by a misplaced switch. It is believed that the switch was maliciously turned and the light extinguished, and the company has offered $1,000 reward for the detection of the perpetrator.

The strikers on the Chicago & Alton at Chicago surrendered unconditionally on Aug. 29. The men at the stock yards also gave in, but as the Switching Association had been dissolved there was no one for them to surrender to. The various roads gradually got the switching work into good shape and business became normal within three or four days. Chairman Sweeney, of the Switchmen's Mutual Aid Association, not only refused to assist the men who struck in such an irregular manner, but gave them a sharp lecture on their rash conduct. The agreement of the Alton men with General Manager Chappell provided as follows:

"That the new men employed to take the places of the strikers shall not be molested in any way.

"That in the future the switchmen shall act only under the rules of the Switchmen's Association in regard to striking, and when non-union men they shall be governed by Mr. Sweeney's advice.

"That the road shall hire or discharge whomsoever it seems fit, but that a discharged employé may appeal his case to the higher officers of the company, who shall hear evidence and return a verdict; also that, so far as it can be done consistently, promotions shall be made from the ranks."

The Southern Pacific met the demands of its trainmen on the Pacific system by advancing their pay considerably. It is said that the increase will amount to $10 a month for brakemen and $25 for conductors.

Pennsylvania Office Building at Jersey City.

The Chief Engineer of the Pennsylvania has prepared plans for a large office building to take the place of the present offices of the company at Jersey City. The building is to be 354.4 by 50 ft., built of brick, with a brown stone base and Ohio stone, brown stone and terra cotta trimmings. It will be five stories high for the distance of 256 by 50 ft.; three stories over the remainder of the distance. The building will cost about $160,000.

A Chief Engineer Wanted.

The government of New South Wales have decided to invite applications in Great Britain, America, and the Australasian Colonies for the position of Engineer-in-Chief for railways, in succession to Mr. Whitton.—*Colonies and India.*

The C. B. & Q. (Cheapest, Best and Quickest) Route to Europe.

The scheme for a railroad from Quebec to St. Charles Bay, Labrador, which has lately been widely advertised in the press dispatches seems to have some connection with the Milford Haven route to London, as is shown by a cable dispatch of Sept. 2, which states that a North Canadian and Atlantic Railroad and Steamship Syndicate has been incorporated at London with a capital of £50,000. The chairman is the Lord Mayor of London, and the directors are Sir Robert Fowler, M. P., Mr. Wood, Chairman of the Milford Docks Company; Mr. Mott, Director of the Great Western Railway, and William Ralston Balch. "The intention is to form a company, with a capital of £4,000,000, to work the Milford route, and construct a railroad from the extreme eastern part of Labrador, probably St. Charles Bay, to Quebec." Now for a neck and neck race between this concern and the Montauk Point Short Line.

Pacific Railroad Lands.

The Secretary of the Interior has decided the case of the Central Pacific Railroad Co. against S. D. Valentine, involving the question of the exception of mineral lands from railroad grants. The particular tract involved is in the Sacramento (Cal.) land district. The Secretary holds that by the terms of the railroad grant all "mineral lands" are excepted from its operation, whether known to be mineral in character at the date when the railroad company's rights attached under the grant or not, if they are discovered to be mineral lands at any time before the issuance of patent to the company, or certification where patent is not required. This decision is contrary to the doctrine laid down by Judge Sawyer, United States Circuit Judge in California, in a recent decision in the case of Franconer against Newhouse.

A Valuable Item for New Jersey.

Word comes from Paris to one of our exchanges that M. Scherer has invented a mosquito net made of copper wire so fine that it is as pliable as the ordinary netting. Under the canopy is an incandescent lamp and the net itself may be connected by means of a switch to the alternating current which supplies the street lights. When the net is covered with expectant mosquitoes attracted by the glow light, the current is turned on and the mosquito goes to rest. M. Scherer, the inventor, says that on the first morning after his net had been put into use his servant took up 322 litres, or about 340 quarts, of dead mosquitos.

Foot-Guards in Ohio.

Railroad Commissioner James A. Norton, of Ohio, has issued a circular to the roads of the state calling their attention to the law of 1888 requiring frogs, switches and guard rails to be filled or blocked to prevent men's feet being caught therein. The commissioner finds "utter non-compliance with the law" in many cases and partial and insufficient blocking in others. He will insist upon a "strict and honest compliance with the law," and that frogs, etc., be not only properly filled, but continuously kept so. The penalty for non-compliance is a fine of $100 to $1,000. The previous commissioner's opinion, that such filling should be of "timber, cinder, gravel or earth," is not concurred in. Something better and more permanent should be used.

A Train Struck by Lightning.

A severe hurricane prevailed at Maisau, Austria, on Aug. 24. During the storm lightning struck twenty goods trucks on the Franz Joseph Railroad throwing them down an embankment and smashing them. The guards on the train were knocked senseless by the shock.

Gross, Tare and Net Time.

Mr. Leonard Franklin—"You came over on one of the record-breakers, didn't you?" Mr. Thomas White—"Yes, sir; seven days after we left Queenstown I was in my house in New York." Mr. Leonard Franklin—"Seven days! I thought you made the trip in less than six." Mr. Thomas White—"I'm counting the time I waited on the dock for my baggage.—*Puck.*

The Quincy Derailment.

Three more persons have died, making the total number of fatal casualties in the derailment at Quincy, Mass., on Tuesday the 19th of August, 22.

The Massachusetts railroad commissioners took testimony concerning the cause of the disaster on Aug. 21. Some of the employés of the road say that the train was running 40 miles an hour, though the majority still say 30, as at first. It appears that the engineer applied the brake, but not in season to slacken the speed materially. The section foreman, J. F. Welch, has served the New York & New England and Old Colony roads in that capacity for over 20 years. He had never used track jacks until he came to the Old Colony the last time, about three months ago, though he had seen them used. The jack was placed inside the rail. The real occasion of the carelessness, as shown by the testimony, was the coming of the passenger train upon the gang of men unawares. They simply had to run for their lives and naturally took no thought of anything else. The sectionmaster testified that the train was less than 500 ft. from where the men were working when he first saw it and that they had to move quickly to get out of the way themselves. A construction train was passing on the opposite track, and the noise of that train apparently drew the attention of the foreman and all his men so that they did not watch for the passenger train. Michael Hartney, who has worked for the Old Colony three months, and who came from Ireland six months ago, was the man in immediate charge of the jack. He testified that the boss had a time table and that when they were at work on a curve he customarily ordered the jack out about the time a train was due. Questioned about the length of time necessary to take out the jack from under the rail, he said that under the most unfavorable circumstances it should not take over one minute. In his testimony he said: "I saw the train coming. I tried to snap the jack, and I couldn't, and I jumped to save my own life. . . . I got excited, and I don't know how long it was after seeing the train before I jumped." Welch admitted that he ordered Hartney to hide the jack. He received instructions to give the order from the roadmaster, E. H. Bryant, the purpose being "that it might be used in the investigation which would follow."

C. B. Lentell, roadmaster of the Boston & Albany, testified that he would not send a flagman out because a jack was in use, but if a jack were being used near a curve he would send out flags, and he would surely do so if he could only see about 300 ft. along the track. He did not believe he had a foreman who would put a jack on a track at a point and at a time when a train was due, and that, too, on a curve.

E. H. Bryant, division roadmaster, said it was a rule of the road that the man who placed a jack in position should have nothing else to do, but should stand by it all the time, ready to move it at a moment's warning. The jack was a Barrett jack, weighing 58 lbs., exclusive of the handle. From a plan of the road, shown at the hearing, it appears that the engineer could have seen the jack about 475 ft. away, but the men may have stood so as to obscure his view.

Joseph F. Welch, the section master, was arrested and imprisoned, but was this week admitted to bail in $2,000.

Concession for a South American Road.

A contract between the Colombian Government and J. L. Cherry, of Milwaukee, Wis., for the completion of the Cauca Railroad from Buenaventura to Cali and Manizares has been signed. It includes the privilege of building extensions to the Gulf of Darien on the north and to the frontier of Ecuador on the south, and from the Cauca River to the Magdalena River and the navigable waters of the Amazon River. The government guarantees a subsidy of five per cent. in gold for 18 years on $63,000 gold per mile, with exclusive privilege for 70 years in a zone extending for 24 miles on each side of the track, with the preference to take all the public lands and all the gold, silver, coal and other mines inside this zone. The contract also includes exemption from duties and taxes.

Workmen Wanted in Colorado.

A dispatch from Denver, Col., says that railroad construction work in Colorado is greatly retarded through the inability of the companies to secure labor. The Denver & Rio Grande is the greatest sufferer. It has at present under construction the Grand Junction branch, 65 miles long; the Rio Grande Southern, 185 miles; the Villa Grove branch, 60 miles; the great tunnel through Tennessee Pass, and a large amount of broad gauging, all of which is almost at a standstill on this account. The officials of the road say they can give employment to from 5,000 to 8,000 men on these new works at $2 per day, and the work is so located as to admit of working all winter.

English Dining Cars.

The London & Northwestern has recently built two dining cars which show a considerable improvement on the saloons at present used for the purpose. Each car consists of two ordinary wagons coupled by a gangway, which can be disconnected, if necessary, in a few moments. At one end are the kitchen and pantry, fitted with gas stoves of the latest make and with capacious cupboards and presses. Electric bells, communicating with each table, serve to attract the attention of the waiter to the travelers who desire to dine. The saloon itself is divided into three compartments, one of which is reserved for smoking. The passengers sit facing each other, between them being a table which can be folded up when not required. The decoration is extremely good, the panels between the windows being of inlaid walnut. The sides and part of the roof are embellished with Lincrusta-Walton paper. Excellent lavatory accommodation is provided and the cars are lighted by softly-shaded lamps supplied with oil gas. The fares charged are to be at the ordinary first class rates, but the saloons will be occupied only by such passengers as intend to dine. The dining charges will be fairly moderate, the culinary arrangements being in the hands of the management of the company's hotel. The new cars are to go into service immediately on the lines to the North of England.—*Herapaths.*

It will be observed that passengers have to perform their whole journey in the dining car.

LOCOMOTIVE BUILDING.

The Georgia Pacific has received from the Baldwin Locomotive Works 15 of the 16 locomotives ordered and also two from the Richmond Locomotive Works.

The Rio Grande Western has placed an order for eight freight locomotives with the Baldwin Locomotive Works and for four passenger engines with the New York Locomotive Works.

The Missouri, Kansas & Texas is reported in the market for about 12 freight engines.

The New York, Providence & Boston is having a 10-wheel locomotive built at the Manchester Locomotive Works, Manchester, N. H. It is to have 19 × 26 in. cylinders, wagon top boiler of ⅛ in. steel, 56 in. in diameter, with 236 2-in. flues. The fire box is 6 ft. 6 in. long, and 2 ft. 11 in. wide inside. The driving wheels are 5 ft. 3 in. in diameter, and will carry 46 tons, the total weight of the engine being 57 tons. The tender will hold 3,500 gallons of water. The wheels are steel-tired.

CAR BUILDING.

The Boston & Maine and the Old Colony are reported to be in the market for passenger cars. The Boston & Maine will also soon ask bids for freight cars.

An order for 100 fruit cars is soon to be placed by the Rio Grande Western. One hundred platform cars have been recently ordered.

The Missouri, Kansas & Texas will soon let the contracts for a number of new freight cars.

Wm. A. Laidlaw, Chas. B. Moore and Lorenzo C. Brooks are the incorporators of the Hanrahan Auto-

matic Refrigerator Car Co., organized at Chicago to build and equip refrigerator cars; capital stock, $500,000.

The Tacoma & Puyallup has let to Hammond & Co., of San Francisco, the contract to build two passenger coaches and eight flat cars.

Two new drawing-room cars, built by the Wagner Palace Car Co., have been put in service on the Shore line between New York and Boston.

The New York, New Haven & Hartford has awarded the contract for building 50 passenger cars to Osgood Bradley & Sons, of Worcester, Mass., not to the Pullman Company, as stated Aug. 1.

The Louisville Southern has just recived five new pas senger cars from the St. Charles Car Co., of St. Charles, Mo.

The Ohio Falls Car Works of Jeffersonville, Ind., has contracted to build 250 platform cars for the Ohio & Mississippi.

The Atlanta & Florida recently placed an order with the Indianapolis Car Works for 125 freight cars.

BRIDGE BUILDING.

Amesbury, Mass.—The County Commissioners have had prepared plans for an iron bridge to be built across the Powow River. It will have two draws, 86 ft. in the clear, swinging from the shore abutments.

Brooklyn, N. Y.—The work of excavation for the foundations of the new iron bridge which is being built to replace an old wooden one spanning the lake in Prospect Park is under way. The contract for the iron work has been let to the Wallace Iron Co., for $15,542, and for the stonework to L. E. Brown, of Brooklyn, for $37,100. The work is to be completed by the end of next year.

Dallas, Tex.—The contract for building two iron bridges over the Trinity River, one six miles below Dallas, and the other over the Elm Fork, five miles above, has been awarded to the Missouri Valley Bridge & Iron Works, of Leavenworth, Kan.

Gloversville, N.Y.—Dean & Westbrook, of New York, have received the contract for erecting a new iron bridge over the Cayadutta Creek on Greene avenue.

Malden, Mass.—J. Ellis has the contract for the building of an iron bridge over the Boston & Maine tracks at this place.

Paris, Ky.—The contract for the construction of the iron bridge across the Houston River, mentioned in our last issue, has been awarded to the King Iron Bridge & Manufacturing Co., of Cleveland, O.

Roanoke, Va.—Bids will be received by J. A. McConnell for the construction of the approaches to bridges over Randolph, Henry and Park streets until Sept. 23.

Sioux City, Ia.—Goodrich & Robson, bridge builders, have begun the construction of a bridge over the Floyd parallel to the Sioux City & Pacific bridge.

Various Projects.—The Missouri, Kansas & Texas proposes to erect about 12 new iron bridges at various points on its line. About 10 bridges have been erected recently.

Washington, D. C.—Senator Faulkner, from the committee on the District of Columbia, has submitted a favorable report on the bill providing for the construction of a bridge across the eastern branch of the Potomac River, at the Benning's road. This bill has already passed the House, and, at the instance of Senator Faulkner, the House bill has been substituted for the Senate bill, so that the former takes the latter's place on the Senate calendar, with the prospect of being passed the first day the Senate goes to work on the calendar.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

In Tennessee the Supreme Court rules that under an act incorporating a railroad company, and providing that the "officers and servants of said company shall be exempt from military duty except in cases of invasion or insurrections, and shall also be exempt from serving on juries and working on public roads," and under a later act, incorporating the same road, and allowing the company "all the rights, powers and privileges" granted by the former charter, a servant of the company is exempt from working on public roads in Alabama.[1]

In Kentucky the Court of Appeals decides that a railroad cannot be taxed by a county to pay the subscription of the county to aid in its construction, thought he county issued bonds in payment of the subscription, and the tax is to pay the bonds.[2]

And in the same case it is held that where the legislature divides a railroad company into two distinct companies, by consent of all the stockholders, the equity which the old company had, to exemption from taxation to pay the subscription of a county to it, passes to the new company.[3]

The Supreme Court of the United States decides that a mortgage on the property of an old railroad corporation, given by the successor to its property and franchises, is entitled to priority over the claim of a creditor for services and advances to the old corporation, who did not obtain a judgment against either corporation until some years after the mortgage was given, and the nature of whose services and advances does not entitle him to a statutory lien on the property of the old corporation.[4]

Carriage of Goods and Injuries to Property.

The Supreme Court of Iowa holds that by virtue of the care for the preservation of goods transported by them which is required of carriers, a railroad receiving butter for shipment South, in summer, is bound to ship the same in such manner as to prevent injury by heat, and its liability is not excused by the fact that it has no refrigerator cars. Such negligence is not excused by the facts that the butter was received from another carrier in a car which was sealed, and that it was the custom to haul cars received from such carrier without changing the cargo. And the railroad's obligation to furnish refrigerator cars for butter received for transportation in hot weather is not discharged by the fact that the freight charges thereon were the rates for common cars, that being no evidence of an agreement that such cars should be used. Where butter has been carried by a railroad in an ordinary freight car, and has consequently been damaged by heat, it is no defense, in an action for such damage, that the freight charges fixed by the way-bill were those for ordinary cars, as such way-bill would not prevent defendant's recovery on account of outlays made in order to transport the goods safely.[5]

In Virginia the Supreme Court of Appeals rules that an agreement limiting the liability of a railroad to a shipper to a certain amount, in case of loss or damage occuring through the negligence of the company, in consideration of a reduced rate of transportation, is valid, though the property is worth much more than that amount, and though by Code Va. 1887, § 1296, an agreement to "exempt" the company from liability occasioned by its own neglect is invalid.[6]

In Texas the Supreme Court holds that as the state statute makes its obligatory on a railroad company in the state, without delay, to carry over its road cars, freight, etc., received from any connecting company, a railroad company is not bound by a through bill of lading, under which it receives freight, in ignorance of its terms, the original carrier having no authority to contract for it. The way-bill of the company showing that, at the time the defendant company received the freight, it paid accrued charges, amounting to as much as the amount fixed in the bill of lading for the entire transportation, is admissible as evidence that it did not intend to ratify the orignal contract.[7]

The Supreme Court of New York holds that in a proceeding by a railroad to condemn a right of way in a street there can be no land taken for station, engine-house, etc., where no necessity is stated for such a condemnation in the petition.[8]

In Illinois the Supreme Court rules that where its charter empowers a railroad company to condemn land "for the construction and maintenance" of its road, condemnation proceedings instituted by the company for land, to be used for the purposes of its road and for the alteration of a public street, are void, even on collateral attack, for want of jurisdiction of the subject matter.[9]

In Kentucky a city condemned a strip of land for railroad and sewer purposes, and, after constructing a roadbed along this, it conveyed to a railroad company "its title to the roadbed, bridges, and right of way" along the entire route, and "all the land belonging to the city," between certain streets, "for depot purposes." The company had formerly occupied a right of way for a double track on other streets, and the city, in consideration of the change of the railroad to the street forming the line of the road in the conveyance, agreed to furnish the company a roadbed. The Court of Appeals holds that outside of the part conveyed for depot purposes nothing but the roadbed was conveyed.[10]

In New York the Supreme Court rules that the construction and operation of a railroad in a public street is an injury to the "inheritance" of the abutting property, within Code Civil Proc. Sec. 1665, providing that "a person seised of an estate in remainder or reversion may maintain an action founded on an injury done to the inheritance, notwithstanding any intervening estate for life or for years."[11]

Injuries to Passengers, Employees and Strangers.

In New Jersey the plaintiff was injured while attempting to use a stairway leading from defendant's depot grounds to a public street. The stairway was built and kept in repair by private persons for their own convenience, but it had been in use by passengers generally on defendant's railroad, and appeared to have been provided as a means of access to and from the depot grounds. The Supreme Court decides that plaintiff was justified in using the stairway, and that defendant was not absolved from the duty of keeping it reasonably safe by the fact that it had provided another stairway which plaintiff might have taken.[12]

In West Virginia the Supreme Court holds that where a railroad chartered by a State permits a foreign railroad company to operate a part of its road in the state under a verbal arrangement, and the two railroads form a continuous line through and beyond the limits of the state, the domestic company will be liable for injuries to a passenger sustained on that portion of its road so operated by the foreign company.[13]

In Alabama, as a train was approaching a station, its name was called and the train was stopped very soon thereafter to take the side track for the passage of another train. When it stopped, plaintiff, whose destination it was, went out of the rear door of the car, and was descending with one foot on the first step of the car and the other about touching the ground, when the train moved to go forward to the depot, which caused him to fall. The place of the stoppage was in a cut, about 200 yds. from the depot building. It was about 1 o'clock p. m. All the surroundings indicated that the spot at which he attempted to leave the train was not the proper place for alighting. The Supreme Court holds the railroad not liable.[14]

In the Federal Court it is held that a passenger in the caboose of a freight train who starts to look out on the sounding of a whistle, indicating the approach to a station, is not thereby guilty of contributory negligence defeating a recovery for injuries sustained, while in such act, by the sudden jerking of the train, in the absence of evidence that the jerking was so usual that it ought to have been anticipated.[15]

An Ohio statute for the protection of railroad employés, requires every railroad in the state "to adjust, fill, or block the frogs, switches, and guard rails on its tracks," so as to prevent the feet of its employés from being caught therein. The Federal Court holds that, where two railroad companies receive cars from each other over a delivery track at a certain point, a person employed by one of them to take the numbers of its cars, and inspect their seals, as trains are made up at such place by the other, is an employé of the latter, within the meaning of this statute.[16]

In Texas there was evidence that plaintiff had been at work for defendant several months, and was working for it when he received his injury; that he was employed by the general yard master of two railroad companies, and that his duties were to make up trains in the yard; that defendant had control of the yard; and that the track on which the injury occurred was kept in repair by it, but that he received his pay from another company. There was also evidence that the yard master performed services for defendant, and some evidence of an arrangement between defendant and the company from which plaintiff received pay for his work, by which plaintiff was to work in the yard for defendant. The Supreme Court desides that plaintiff was the special servant of defendant at the time of receiving the injury.[17]

In Iowa the conductor of a freight train on which plaintiff was a brakeman received an order to attach a "bad-order" car to his train, a copy of which order was given to plaintiff. The car was without a draw bar, in consequence of which it could be attached to a train only by means of a chain. This defect allowed the car, and the car next it, to come so close together as to crush a person stading between. Plaintiff saw the bad-order car attached by means of a chain. Afterward it became detached; and plaintiff and another brakeman, while their train was moving very slowly, pushed the car along to overtake the train. When within a short distance from the train, plaintiff, seeing the chain hanging down, went to the front of the car to pick it up. After taking a few side steps, he secured the chain, and when he stood erect he was crushed between the bad-order car and the rear car of the train; the train having stopped without plaintiff's knowledge. The Supreme Court rules that the railroad is not liable.[18]

In Minnesota a man who had been employed for about two weeks in defendant's yard, where were numerous tracks and constantly moving trains, was killed by coming in contact with a signal post while ascending the outside ladder of a box car. The signal post was between two tracks, about four feet from the rail. The Supreme Court rules that it could not be said, as a matter of law, that the man was guilty of contributory negligence in not observing that the post was so near the cars as to be dangerous, and in not appreciating and avoiding the danger.[19]

In Pennsylvania a workman directed to go into a car near which a large stone was hanging suspended by a chain, went under the stone and was injured by the breaking of the chain. He knew the chain was considered unsafe by the men using it, and he could have reached the car without passing under the stone. The Supreme Court rules that he was guilty of contributory negligence.[20]

In Indiana the Supreme Court decides that a brakeman unnecessarily walking upon the track and giving no heed to the approach of a train which he knows must follow him is guilty of such contributory negligence as will preclude recovery for his death by reason of his being run over by that train.[21]

1 Johnson v. State, 7 South. Rep., 253.
2 L. & N. R. Co. v. Com., 12 S. W. Rep. 1064.
3 L. & N. R. Co. v. Com., 12 S. W. Rep., 1064.
4 Fogg v. Blair, 10 S. Ct. Rep., 33.
5 Beard v. Ill. Cent. R. R. Co., 41 N. W. Rep., 800,803.
6 Richmond & D. R. Co. v. Payne, 10 S. E. Rep., 749.
7 Gulf, C. & S. F. Ry. Co. v. Dwyer, 12 S. W. Rep., 1001.
8 In re Union El. R. Co., 8 N. Y. S., 813.
9 Chicago & N. W. Ry. Co. v. Galt, 23 N. E. Rep., 425.
10 Long v. Louisville & N. R. Co., 13 S. W. Rep., 3.
11 Mortimer v. Manhattan Ry. Co., 8 N. Y. S., 536.
12 Delaware, L. & W. R. Co. v. Trautwein, 19 Atl. Rep., 178.
13 Rickets v. Chesapeake & O. Ry. Co., 10 S. E. Rep., 801.
14 Smith vs. Geo. Pac. R. Co., 7 South Rep., 119.
15 Lusby v. A., T. & S. F. R. Co. 41 Fed. Rep., 181.
16 Atkyn v. Wabash R. Co., 41 Fed. Rep., 193.
17 Missouri Pac. Ry. Co. v. Jones, 12 S. W. Rep., 972.
18 Rebelsky vs. C. & N. W. R. Co., 44 N. W. Rep., 536.
19 Johnson v. St. Paul, M. & M. Ry. Co., 44 N. W. Rep., 884.
20 Kinney v. Corbin, 19 Atl. Rep., 141.
21 Pennsylvania R. Co. v. O'Shaughnessy, 23 N. E. Rep., 675.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Toledo & Ohio Central, quarterly, 1½ per cent. on the preferred stock, payable Oct. 1.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Albany & Susquehanna, annual, New York City, Sept. 17.

Baltimore & Ohio, annual, Baltimore, Md., Sept. 8.

Baltimore & Ohio & Chicago, special, Deshler Block, Columbus, O., Sept. 26.

Boston & Albany, annual, 78 Tremont Street, Boston, Mass., Sept. 24.

Chicago, Milwaukee & St. Paul, annual, Milwaukee, Wis., Sept. 20.

Connecticut River, annual, Springfield, Mass., Sept. 17.

Dallas & Greenville, annual, Dallas, Tex., Sept. 6.

Dallas & Waco, annual, Dallas, Tex., Sept. 6.

Dallas & Wichita, annual, Dallas, Tex., Sept. 6.

Delaware & North River, special, 10 Wall street, New York City, Sept. 23, to act upon a proposed consolidation with the Port Jervis, Monticello & New York.

Fitchburg, annual, Boston, Mass., Sept. 24.

Gainesville & Henrietta, annual, Gainesville, Tex., Sept. 9.

Illinois Central, annual, Chicago, Ill., Oct. 8.

Lake Erie & Western, annual, Bloomington, Ill., Oct. 1.

Maine Central, annual, Portland, Me., Sept. 17.

Minneapolis, St. Paul & Sault Ste. Marie, annual, Guaranty Loan Building, Minneapolis, Minn., Sept. 16.

Nashville, Chattanooga & St. Louis, annual, Nashville, Tenn., Sept. 10.

New York, Providence & Boston, annual, Providence, R. I., Sept. 10.

Ohio, Indiana & Western, annual, Indianapolis, Ind., Sept. 9.

Old Colony, annual, Boston, Mass., Sept. 30.

Pittsburgh, Cincinnati, Chicago & St. Louis, special, Pittsburgh, Pa., Sept. 16.

Port Arthur, Duluth & Western, special, Port Arthur, Ont., Sept. 23.

St. Johnsbury & Lake Champlain, annual, St. Johnsbury, Vt., Sept. 11.

St. Louis, Alton & Terre Haute, special, Laclede Building, St. Louis, Mo., Oct. 3, to consider the sale to the Cairo, Vincennes & Chicago.

St. Louis Merchants' Bridge Terminal, special, Laclede Building, St Louis, Mo., Oct. 1, to vote upon a proposed increase of the capital stock.

South Atlantic & Ohio, annual, Bristol, Va., Sept. 10.

Wabash, annual, St. Louis, Mo., Sept. 9.

Railroad and Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Roadmasters' Association of America* will hold its eighth annual convention at Detroit, Mich., Sept. 9.

The *Claim Agents' Association* of the Eastern, Middle and Southern States will be held at Chicago, Sept. 11.

The *American Association of General Passenger & Ticket Agents* will hold its thirty-fifth semi-annual meeting at Denver, Col., Sept. 16.

The *American Society of Railroad Superintendents* will hold its annual meeting in New York City, Oct. 7.

The *General Time Convention* will hold its next semi-annual meeting at the Hotel Brunswick in New York City, Oct. 8.

The *New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m. The Club has adjourned until Tuesday, Sept. 16.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The *Northwest Railroad Club* meets on the first Saturday of each month in the St. Paul Union Station at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Saturday following the second Wednesday of each month at 7:30 p. m. in the directors' room of the St. Paul Union station, except in the months of July and August.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month. at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at the American House, Boston, at 7:30 p. m. on the third Wednesday in each month. The next meeting will be held the third Wednesday in September.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m , on the first Tuesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the House of the Club, 1,122 Girard street, Philadelphia.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Penn Building, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month at the Club rooms, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8:00 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the Southwest* holds regular meetings on the second Thursday evening of each month at 8 o'clock, at the Association headquarters, Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7.30 p. m., on the third Saturday in each month.

The Civil Engineers' Association of Kansas holds regular meetings on the first Wednesday in each month at Wichita, Kan.

Northwest Railroad Club.

The subject for discussion at the next meeting, to be held at the St. Paul Union Depot, Sept. 6, is Fire-box and Boiler Construction, to be introduced by W. H. Lewis, of the Chicago, Burlington & Northern.

Old Timers' (Telegraphers) Society and Society of the United States Military Telegraph Corps.

The tenth annual reunion of these societies will be held at Kansas City, September 15 and 16. Arrangements have been made for reduced railroad fares on the certificate plan. The Secretary of the first-named society is William J. Dealy, 195 Broadway, New York City, and of the other J. E. Pettit, 145 Campbell avenue, Chicago. The head of the local Committee of Arrangements at Kansas City is Day K. Smith, Superintendent of the Kansas City Belt Road.

PERSONAL.

—Secretary Tams Bixby, of the Minnesota State Railroad Commission, has resigned. His successor will be A. K. Tiesberg, now Chief Clerk.

—Mr. Addison Hills, assistant to John Newell, President of the Lake Shore & Michigan Southern, completed his fiftieth year in railroad service on Aug. 28.

—President Chauncey M. Depew, of the New York Central & Hudson River, is on his way home from Europe, having sailed on the "Teutonic" Wednesday.

—Mr. William H. Burns, who has been Assistant Division Superintendent of the Union Pacific, at Council Bluffs, Ia., has been appointed General Manager of the Montana Union to succeed Mr. W. H. Baldwin.

—Judge Veazey, of the Interstate Commerce Commission, has gone to St. Louis, Mo., and to Kearney, Neb., and other points further West to hear cases assigned for trial at those points. He will be joined at St. Louis by Commissioner Morrison.

—Mr. W. H. Chadbourn, Jr., who has recently been Assistant Engineer on the West Virginia & Ironton, the Ohio extension of the Norfolk & Western, has resigned to become Chief Engineer of the Wilmington, Chadbourn & Conway, a position which he formerly held.

—Mr. C. F. Thomas, Master Mechanic of the Central of Georgia at Macon, has resigned to go to the Richmond & Danville, having accepted a similar position with the latter at Alexandria, Va. He came to the Central from the East Tennessee, Virginia & Georgia not long ago.

—Mr. John Westinghouse, senior member of the Westinghouse Company, manufacturers of agricultural implements, of Schenectady, and eldest brother of George Westinghouse, Jr., died Tuesday night at his residence in Schenectady, N. Y., aged 50 years.

—D. I. Roberts, Assistant General Passenger Agent of the Pennsylvania lines at Cincinnati, has tendered his resignation, to take effect Sept. 10. He will then, it is said, enter the service of the Erie as Assistant General Passenger Agent, with headquarters either at Cleveland or Chicago.

—Mr. W. J. Lawrence, Superintendent of the Western Division of the lines of the Chicago, Rock Island & Pacific, west of the Missouri River, has been appointed Superintendent of the Colorado Midland, to succeed Mr. Thomas Saunders, who has been appointed Superintendent of the Rio Grande Junction road.

—Mr. C. J. Smith, who has been General Manager of the Pacific division of the Union Pacific since the office was established, has resigned to accept a position with the Oregon Improvement Co. Mr. Smith has been succeeded by Mr. Edwin McNeill, who has been General Manager of the St. Joseph & Grand Island road for the past few years.

—Mr. Robert Law, late General Superintendent of the St. Louis, Keokuk & Northwestern and Chicago, Burlington & Kansas City, has taken charge of the switching at the Union Stock Yards, Chicago, having been appointed by the Executive Committee of the Superintendents, which manages the business and property of the late Switching Association.

—Mr. M. A. McDonald, General Manager of the Pittsburgh & Western, has resigned, and has been succeeded by Mr. J. V. Patton, Superintendent of the Pittsburgh Division of the Baltimore & Ohio. Mr. McDonald was appointed General Manager of the road in May, 1889. He was previously, for over three years, General Manager of the Cairo, Vincennes & Chicago.

—Mr. A. W. Littig, Superintendent of the First division of the Houston & Texas Central, has resigned that position on account of his failing health. He intends to remain among the mountains of Colorado until winter and then go South. Mr. Littig's service on this road has extended over a period of 20 continuous years, his first position being that of brakeman.

—We hear on good authority, says the *Pall Mall Gazette*, that Sir Richard Moon, Bart., the chairman of the London & Northwestern Railway Co., has, by reason of the condition of his health, felt compelled to intimate his intention to resign shortly his position as head of the administration of the greatest railway in the kingdom. Sir Richard Moon has been intimately identified with the company for over forty years.

—Mrs. Mary Elizabeth Cooley, wife of Judge Thomas M. Cooley, Chairman of the Interstate Commerce Commission, died at her home in Ann Arbor, Mich., on Sunday last, of cancer of the stomach. Mrs. Cooley had long been prominently identified with church charitable work in Michigan, having occupied the office of President of the Board of Control of the State Industrial School for a number of years. Four sons and two daughters survive her.

ELECTIONS AND APPOINTMENTS.

Bloomfield Junction.—The incorporators of this Pennsylvania company are: W. H. Sponsler, of Pittsburgh, President, and J. L. Markel, Jas. W. Shull and E. R. Sponsler, of New Bloomfield.

Chicago & Erie.—The Chicago & Atlantic Railroad was formally turned over to the new owners, the New York, Lake Erie & Western, on Sept. 1. Vice-President S. M. Felton, Jr., of the Erie, took charge, and announced the following appointments: E. B. Thomas, General Manager; G. G. Cochran, General Freight Agent; F. C. Donald, General Passenger Agent. Accounts for August should be settled with V. L. Malott, the retiring receiver. A. M. Tucker, General Superintendent of the New York, Pennsylvania & Ohio division of the Erie, is to have the Chicago & Erie attached to his jurisdiction; but C. L. Mayne, Superintendent, with headquarters at Huntington, Ind., will continue in his present position. Mr. Thomas retains his headquarters in New York, the new office being an addition to his duties as Second Vice-President of the Erie.

Chicago, Milwaukee & St. Paul.—The following appointments have been announced: D. C. Jones, Assistant General Freight Agent at Chicago, is transferred to St. Paul to fill the vacancy caused by the death of J. C. Boyden; J. L. Kellogg is appointed to succeed Mr. Jones at Chicago, and J. M. Davis, Division Freight Agent at Chicago, is transferred to Milwaukee, vice Mr. Kellogg.

Chicago, Rock Island & Pacific.—S. B. Hovey has been appointed Superintendent of the western division, with headquarters at Colorado Springs, vice W. J. Lawrence, resigned to accept a position on the Colorado Midland. W. R. Morton is appointed Trainmaster, with headquarters at Goodland, Kan.

Chicago, St. Paul & Kansas City.—The headquarters of the Chicago division have been transferred from Chicago, Ill., and Oelwin, Ia., to Dubuque, Ia.

Colorado Midland.—W. J. Lawrence has been appointed Superintendent of the road. The appointment took effect Sept. 1.

Gouverneur & Adirondack.—The officers of this new company are: Fred B. Roblin, President; Frank Walts, Treasurer, and E. C. Cooke, Secretary, Everson Building, Syracuse, N. Y. E. G. Ferriss is the Chief Engineer.

Great Falls & Canada.—The stockholders elected the following directors at a recent meeting in Great Falls, Mont.: Donald Grant, Sir A. F. Galt, W. A. Barr, J. E. Collins and Geo. H. Wainwright. The directors elected officers as follows: Donald Grant, President; W. A. Barr, Secretary and Treasurer.

Great Northern.—F. L. Porter, late Assistant General Manager of the Erie Dispatch, has been appointed General Freight Agent of this road, vice G. M. Sawyer, resigned.

Haines, Hamilton & Kingston.—The following officers have been elected: Messrs. C. D. Haines, President; E. T. Haines, Vice-President and General Manager; Chas. D. Haines, Secretary and Purchasing Agent; A. G. Haines, Treasurer; D. S. Haines, Superintendent; T. M. Long, of St. Joseph, Mo., Chief Engineer. The principal office is at Kingston, Mo.

Houston & Texas Central.—A. W. Littig, Superintendent of the first division, having resigned, J. M. Lee has been appointed to succeed him, under the title of Engineer and Superintendent of the first division, comprising all road south of the International & Great Northern crossing at Hearne on the main line and the western branch from Hempstead to Austin. Mr. Lee came from the northwest branch, and Donald Allen has been appointed Superintendent there to succeed him. Mr. Allen held this position once before, but has been on the Louisville & Nashville for some time.

Lancaster, Oxford & Southern.—The incorporators of this company, which was formed at Lancaster, Pa., this week, are: Walter M. Franklin, John C. Hager, J. W. B. Bausman, E. K. Martin, S. Everett Ramsey, Jos. M. Showalter and R. B. Patterson, Directors. The directors organized by electing Mr. Franklin President and Mr. Bausman Secretary and Treasurer.

Louisville, New Orleans & Texas.—John T. Savage has been appointed Assistant Superintendent of the road in charge of the Riverside division. T. P. Bellows succeeds Mr. Savage as trainmaster of the division south of Vicksburg, Miss.

Louisville Southern.—E. L. Ryder has been appointed Master of Transportation in place of N. B. Patterson, and Hugh Byrnes has succeeded James Anderson as Roadmaster.

McKeesport & Versailles Belt Line.—The directors of this new Pennsylvania road are: W. B. Peters, John R. Romaine, E. F. Woods, J. C. Smith, E. P. Douglass and W. D. Reed, all of McKeesport, Pa., and Thomas Reynolds, Reynoldton. W. B. Peters is President.

Montana Union.—W. H. Burns has been elected President and General Manager of this company, with headquarters at Butte, Montana, vice W. H. Baldwin, Jr., resigned.

New Orleans & Northwestern.—W. H. McClintock, Assistant Superintendent of Roadway of the Louisville, New Orleans & Texas, has accepted the general superintendency of this road, with headquarters at Natchez, Miss. Mr. McClintock was formerly Division Superintendent of the Central of Georgia. C. H. Oglivie has been appointed General Freight and Passenger Agent, with office at Natchez.

New York Central & Hudson River.—William T. McCulloch, for four years traveling auditor, has been appointed Assistant Division Superintendent with headquarters at Syracuse.

Northern Pacific & Manitoba.—President Oakes, of the Northern Pacific, announces that the jurisdiction of the general officers of the Northern Pacific will extend over the Northern Pacific & Manitoba. J. M. Graham will remain as General Manager, in charge of operation, reporting to the General Manager of the Northern Pacific. Herbert Swinford will remain as General Manager of the traffic department, reporting to the traffic officers of the Northern Pacific.

Opelika Terminal.—The incorporators of this new road are: W. J. Sanford, S. O. Houston, T. M. Renfro, J. L. Dean, N. P. Renfro, J. L. Cowan, T. P. Henderson, Opelika, Ala.; R. L. S. Heitt, Americus, Ga., and John Sibley, Augusta, Ga.

Oregon Improvement Company.—B. T. Carr has been appointed General Superintendent of the company, operating the Columbia & Puget Sound, Seattle & Northern and Port Townsend Southern railroads, and the Puget Sound Steamer Line.

Philadelphia & Reading.—F. E. Bausher has been appointed Traveling Passenger Agent of the Williamsport and Catawissa Divisions, with office at Williamsport, Pa. H. Dickinson, now Excursion Agent, has been appointed Traveling Passenger Agent of the Main Line and Reading & Columbia and Pine Grove Divisions, with office at Reading, Pa.

Philadelphia & Sea Shore.—W. Grant Wilson has been appointed General Manager of this road.

Port Townsend Southern.—Mr. C. R. Shearer has been appointed Superintendent of this road, with headquarters at Port Townsend, Wash.

Potomac Valley.—The stockholders of the new road elected the following directors at a meeting in Baltimore last week: John M. Hood, W. A. Boyd, C. W. Humrichouse, Victor Cushwa, James Findlay, S. D. Schmucker and Robert Biggs. Mr. John M. Hood was elected President and George H. Baer Secretary and Treasurer.

Richmond & Danville.—C. F. Thomas, Master Mechanic of the Central of Georgia at Macon, Ga., has been appointed Master Mechanic of this road, with office at Alexandria, Va.

Rio Grande Southern.—President Otto Mears announces the appointment of R. M. Ridgeway as Superintendent, with headquarters at Salida, Colo., and J. H. Ridgeway as Assistant Superintendent, with headquarters at Ridgeway.

Roanoke & Southern.—The officers of this road are: H. S. Trout, President, and S. W. Jamison, Secretary, Roanoke, Va.; C. H. Fogle, Treasurer, and F. H. Fries, General Manager, Salem, N. C.; G. W. Maslin, Superintendent, and A. Onderdonk, Chief Engineer, Winston, N. C.

St. Joseph & Grand Island.—W. P. Robinson, Jr., formerly General Freight Agent of this road, has been appointed General Manager, to succeed E. McNeill, who has been appointed General Manager of the Pacific division of the Union Pacific.

San Bernardino & Eastern.—The directors referred to last week are: A. Manvel, of Chicago, and K. H. Wade, Godfrey Holterhoff, T. B. Henderson and T. R. Wilson, of Los Angeles, Cal. Godfrey Holterhoff has been elected temporary Chairman.

San Francisco & San Joaquin.—The officers are: Isaac R. Wilbur, President; Louis F. Monteagle, Secretary; Timothy Paige, W. J. Little and John S. Wilbur, directors.

Union Pacific.—W. H. Baldwin, President and General Manager of the Montana Union road, has been appointed assistant to Vice-President W. H. Holcomb, with headquarters at Omaha, Neb.

Wheeling & Lake Erie.—Downer Adams, who for the past three years has been Assistant Auditor of Freight Accounts of the New York Central & Hudson River road, has been appointed Auditor of this road with headquarters at Toledo, O.

Winona & Southwestern.—C. L. Stewart was recently appointed Assistant Superintendent, with headquarters at Winona, Minn.

R. H. Emerson has been appointed Master Mechanic with headquarters at Winona.

A. W. Loftus was on Sept. 1 appointed Road Master with headquarters at Winona.

RAILROAD CONSTRUCTION.

Incorporations, Surveys, Etc.

Anacortes Electric.—This electric road will be 11 miles long, reaching from the south end of Fidalgo Island to Anacortes, Washington. It must be completed and in operation by Jan. 1 next. Grading will commence at once. Two contracts have already been let, one to M. Tebo for a pile bridge, and another for clearing away timber to A. Lathrope. The bridge is to be built across Fidalgo Bay, and will be 300 ft. long. The plant and roadbed when completed will cost $200,000. The Thomson-Houston system is to be used. Six cars have already been ordered, as well as 700 tons of rails and two dynamos.

Atikokan Iron Range.—Application is being made to the Dominion Parliament for an act to incorporate this company to build a railroad from a point on the Canadian Pacific between Carlstadt and English River, by way of the Atikokan and Seine rivers, to or near Sturgeon Falls, Ont.

Atlantic City.—The line of the Brigantine Beach Railroad referred to last week, extending from Brigantine Junction to Brigantine Beach, N. J., was regularly opened for business Aug. 28. It will be operated as the Brigantine Branch of the Atlantic City Railroad.

Bellingham Bay & British Columbia.—Mr. D. McGillivary has been awarded the contract to construct 7¾ miles of road for this company from the International boundary to the Nooksack River. He also will build a bridge, consisting of two spans, each 150 feet in length, across that river, and one and a half miles of trestling for the approaches. Mr. McGillivary has now a large gang of men engaged in Seattle, and work will begin immediately on the line within the United States. Both this contract and that on the Mission branch will be completed in about two months.

Black Hills & Fort Pierre.—The extension from near Central City easterly a few miles to Deadwood, S. D., has been completed and the operation of the line will be commenced as soon as the rolling stock is received. This is expected in a few days.

Bloomfield Junction.—This company was incorporated in Pennsylvania last week to build a road from Bloomfield, Perry county, at the terminus of the Perry County road to a point intersecting the survey of the Newport & Sherman's Valley road in Centre Township. The length of the road is about three miles. The capital stock is $25,000. W. H. Sponsler, of Pittsburgh, Pa., is President.

Chicago, Fort Madison & Des Moines.—The cross ties for the standard gauge track between Fort Madison and Collett, Ia., 45 miles, are being laid, and new bridges are being erected. When this work has been finished, the standard gauge track will be put down. The road will be extended from Collett, the present terminus to Ottumwa, and from there probably west to Council Bluffs, via Albia, Des Moines, Winterset, etc. The entire line has been located, and the road will be built by the Illinois & Iowa Construction Co., 185 Dearborn street, Chicago. The grades will be less than 53 ft. to the mile. The road has no bonded indebtedness, and is owned entirely by a syndicate, of which Willard T. Block is President.

Chicago, Milwaukee & St. Paul.—Surveyors who have been running a line for this company from Chamberlain, S. D., to the Black Hills have finished their work and submitted surveys, profiles, etc., at the meeting of the Board of Directors which met in Chicago Tuesday.

Decatur & Greenville.—The projectors of this road have asked a subscription of $30,000 from Chickasaw County, Miss. The road is proposed from Decatur, Ala., southwest through Houston and Okolona, Miss., and thence toward Greenville. A line was surveyed between Houston and Okolona, about 19 miles, last December by the Mobile & Ohio. J. Buchanan is one of the projectors.

Duluth, Red Wing & Southern.—It is said that work will soon be begun on this road at Duluth. Some time ago the Mitchell & McClure lumber syndicate purchased about 500,000,000 ft. of pine in Douglas County, Wis., and made arrangements to build a big sawmill at West Duluth. The original plan was to build a narrow gauge logging road from the St. Louis River, eight or ten miles out into the timber, but later the Duluth, Red Wing & Southern proposed to build the road and give the syndicate privileges if it would aid in building it, and this was agreed to. The Duluth Land Co., a new syndicate just starting a manufacturing suburb of Duluth, will also aid the road.

Duluth & Winnipeg.—Work has been stopped on this road through the Winnebigoshish Indian reservation pending a settlement with the Interior Department at Washington. The company will file maps showing what lands are wanted for right of way and station purposes, and the Secretary of the Interior will fix the compensation to be paid the Indians.

Gaspe Short Line.—The promoters of this road are now having the line surveyed preparatory to commencing construction. The line is to extend from the junction of the Baie des Chaleurs at Paspebiac, thence southwesterly to deep water at Gaspe Basin, Que., a distance of about 65 miles, passing through the counties of Gaspe and Bonaventure.

Great Northern.—It is stated that Shepard, Stein & Co., of St. Paul, have secured the contract for the building of the road between Assiniboine, Mont., and Spokane Falls, Wash. There is a scarcity of workmen, however, in the Northwest, and the accounts give no intimation as to when work will begin.

Illinois Central.—A short branch has been completed between Blandville and Bardwell, Ky. The line was projected as a freight branch exclusively but it has been decided to run passenger trains also. Some of the shops at East Cairo, Ky., are be removed to a new town near Blandville.

Kansas City, Fort Scott & Memphis.—A small portion of the work for the second track between Kansas City and Olathe, Kan., has been completed under various contracts, but it is unlikely that any more will be undertaken this year. The length of track covered by this improvement is 20.7 miles. No new track has been laid. The alignment and grades will be corrected when practicable, in minor details only. The maximum grade will be 40 ft. per mile, compensated on curves.

Knoxville Southern.—The City Council of Knoxville, Tenn., on Aug. 29, unanimously passed an ordinance to issue city bonds to the amount of $275,000 in favor of this road, which was recently completed, and to take the company's stock at par for the same.

Lake Temiscamingue Colonization.—This road has been surveyed and located from Mattawa, Ont., to the foot of the Long Sault, a distance of about 33 miles. It is not known definitely when the work or construction will be commenced.

Lancaster, Oxford & Southern.—A company with this name has been organized at Lancaster, Pa., to build a railroad from Quarryville, Pa., on the Philadelphia & Reading, to White Rock; thence over the bed of the Peach Bottom (narrow gauge) railroad nine miles to Oxford; thence a new road 11 miles to Singerly Station, on the Philadelphia division of the Baltimore & Ohio. This route has already been surveyed and located. The section of country through which the projected line passes from Quarryville southward is thickly settled and abounds in agricultural and mineral wealth. Along the old narrow gauge railroad there are quite a number of mills, quarries, factories and other thriving industries.

Laselle & Bureau County.—Articles of incorporation have been filed in the office of the Secretary of State at Springfield, Ill. The principal office is at Laselle, Ill., and the line is to be constructed from a point near Laselle in a northeasterly direction through Laselle and Demmick to Hall, in Bureau County. The capital stock is $50,000, and the incorporators and first board of directors are: Edward C. Hegler, F. W. Mattheson, G. Wertz, Charles Disterwegen and A. J. O'Connor, of Laselle.

Louisiana, Arkansas & Missouri.—Grading has been recently resumed on this road by the Fruin-Bambrick Construction Co., of St. Louis, after a long suspension. The work was begun last fall between Trippe Junction and Alexandria, La. About 25 miles of the work between these points is very heavy, but the balance is light. The tracklaying on the first five miles will probably be completed this month. The surveys have been made between Brinkley, Ark., and Alexandria, and the contracts awarded to the Fruin-Bambrick Construction Co. Probably but few sub-contracts will be let. Harlow M. Hoyt, of 54 William street, New York City, is President, and W. C. Agnew, of Youngstown, O., is Chief Engineer.

Macon & Birmingham.—The track has been laid between Macon Junction and La Grange, Ga., on the Atlanta & West Point, a distance of 95 miles, with the exception of a few miles at La Grange and at Thomaston. The expense of building the line through the latter town is to be borne by the citizens to the extent of $19,000, which it is estimated it will cost. The company had surveyed a line a few miles south of Thomaston, the engineers stating that the construction of a line through the town would involve great expense. It could not be operated economically, and it would involve a deflection from an otherwise direct line. The town appealed to the courts for an order to compel the company to build through the town, and finally a decision was made by the Supreme Court, ordering that the road be built through the town, if the town voted $19,500 to reimburse the company for the additional cost of the line over that proposed by the company. This amount was soon subscribed.

Manitou & Pike's Peak.—The passenger travel on this road was closed Aug. 28 for the season, as all the motive power is needed to push the work of construction so as to complete the road before cold weather. About three miles of track remain to be laid.

McKeesport & Versailles Belt Line.—The charter of this company was filed in Pennsylvania last week. The road is to begin at the southerly boundary line of McKeesport near Walnut street and extend in a northerly direction through Versailles to Long Run; thence up that stream in an easterly direction to a point near the Long Run Bridge and northerly to the easterly line of the borough at Fifth avenue. The distance is about five miles. The capital stock is $50,000. W. B. Peters, McKeesport, Pa., is President.

Mobile & Girard.—This road, a part of the Central of Georgia system, is building an extension from Troy southwest to Andalusia, Ala., about 53 miles. About half the line is located and contracts for grading, bridging and ties have been let. Worthington, Elliott & Debardeleban, of Birmingham, are the contractors, represented at Troy by R. C. Strother. Sub-contractors have begun work on some 20 miles of the line. The grading is not difficult; maximum grades, 66 ft. There will be one iron truss bridge with a single span 100 to 150 ft. long; also a 3,000 ft. trestle over Conecuh River. F. Y. Dabney, of Savannah, is Chief Engineer.

Montgomery, Tuscaloosa & Memphis.—The surveys for the extension beyond Tuscaloosa, Ala., northwest to Artesia, Miss., on the Mobile & Ohio and Georgia Pacific, were to have been commenced this week. All the sub-contracts between Maplesville and Tuscaloosa have been let.

Nashville, Chattanooga & St. Louis.—President Thomas has ordered a survey from Lebanon, Tenn., east to the line of the Cincinnati Southern, 91 miles. A road over this route would bring Knoxville within 177 miles of Nashville, a saving of 86 miles as compared with the route by way of Chattanooga. Tracklaying is in progress on the Pikeville extension of the road and trains will probably be running to Pikeville by Dec. 1.

New Roads.—Citizens of Reidsville, Ga., have subscribed $7,000 toward building a railroad from that place to the Savannah & Western road. The line will reach the latter road at the fifty-eighth mile post. H. J. McGee and C. N. Brazell, of Reidsville; R. L. Hicks, of Thomasville; Thomas B. Hicks, of Dublin, and Henry Hicks, of Wrightsboro, are interested.

Subscriptions are being received and right of way secured for a proposed road from Abilene, Tex., to the junction with the Gulf, Colorado & Santa Fe at San Angelo, a distance of about 75 miles.

E. M. Railton, of San Francisco, proposes to build a railroad from Fresno, Cal., to King's River, a distance of about 25 miles, if the right of way is granted free and a subscription of $100,000 is voted.

A company which has recently purchased large timber lands near Bettinger, Md., proposes to build a narrow-gauge road to that point from Frostburg.

Grading has begun on a railroad from the Egypt coal mine, Egypt, N. C., to the Raleigh & Augusta Air-Line, 7 miles. The contract has been awarded to the penitentiary authorities, and it will be completed in 90 days. The new road will intersect the Raleigh & Augusta about two miles south of Osgood. Several thousand cross ties have been already cut.

New York, Philadelphia & Chicago.—The Secretary of State of Pennsylvania has granted a charter to this company to build a road in Venango, Clarion, Jefferson and Clearfield counties. It is to be 90 miles in length, and the capital stock is $250,000. The directors are Charles Miller, Samuel Plummer, Joseph C. Sibley, Daniel Gramm, Arnold A. Plumer and Christopher Heydrick, of Franklin, and Julius E. French, of Cleveland, O.

Northern Pacific.—Contractors King & Dickinson have three contracts with this company aggregating $250,000. They have gangs of men at work near Kalama, Wash., where they are blasting out 100,000 cu. yds. of rock.

The contractors for grading the line from Chehalis Wash., to Willapa Harbor, Webster, Relso & Co., of Portland, Ore., have completed three miles of grading, and have about five miles of right of way cleared. They have three camps, one near the junction of the Chehalis and Newaukum rivers, where there are 50 teams and about 75 men; the second half a mile west of Claquato, where there are the same number of men and teams, and the third camp, about six miles west of Chehalis, where the men are clearing the right of way. The Chehalis River is crossed three times in the first nine miles. The contractors make a complaint similar to that made by all the railroad contractors in Washington that they cannot engage nearly as many men as they have work for.

Opelika Terminal.—The articles of incorporation of this company have been filed with the Secretary of State at Montgomery, Ala., last week. The proposed road will run from Anniston, Ala., through Opelika to St. Andrews, Fla.

Pecos Valley.—An amended charter consolidating the Pecos Valley and the Pecos Northern companies was filed at the office of the secretary of the territory at Santa Fe, N. M., Aug. 29. The first-named road is now in course of construction between the Texas line and the town of Roswell in the Pecos Valley, some 30 miles having been completed. By Nov. 1 it will have been finished as far north as the town of Eddy. The second road is designed to build in a northerly direction from Roswell through the counties of Chavez, San Miguel or Lincoln, Vallencia and Bernalillo to a connection with the Atchison, Topeka & Santa Fe. The amended articles also contain a clause authorizing the company to control the Pecos River Co., which is that part of the line within the state of Texas. The title of the consolidated company is the Pecos Valley Railway Co. The capital stock is $5,000,000, and the incorporators are James J. Hagerman, H. C. Lowe, Irving Howbert, Louis H. Jackson, Charles B. Eddy, Thomas H. Edsoll, Charles E. Noble, Percy Hagerman, S. M. Folsom and John Aple. The total length of the proposed line of road is 315 miles. The construction of the road from the Texas & Pacific road north is going on satisfactorily. Thirty-two miles of track has been laid, 60 miles graded, and the work of laying rails is progressing at the rate of 1½ miles per day.

Pennsylvania.—An extension of the Turtle Creek Valley road to Newlensburg, Pa., about 12 miles northwest of Turtle Creek, is reported to have been placed under contract last week.

Pennsylvania Narrow Gauge.—Work has begun on this short road running between Allyn and Bergen on Hood's Canal, State of Washington. The line is three miles long.

Perry Park.—Incorporation papers of this company have been filed in the office of the Secretary of State of Colorado. The directors are John D. Perry, of St. Louis; Charles A. Roberts, of Denver; David R. Francis, of St. Louis; Bela A. Hughes, of Denver; Sarah C. Emerson, of Detroit; Charles A. Munland and J. Duval Winters, of Denver. The principal office will be in Denver. The capital stock is $150,000. The company is to build a railroad and telegraph line from Sedalia, in Douglas County, Col., southerly to Palmer's Lake, in El Paso County.

Rio Grande Junction.—It is expected that local trains will be put on this road between New Castle and Grand Junction, Colo., on Sept. 15 by the Colorado Midland. Through trains between Denver and Ogden are not to be operated until about Oct. 1, when the standard gauging on the Denver & Rio Grande will probably be finished between Denver and New Castle.

Roanoke & Southern.—This road is now in operation from Winston, N. C., via Ogburn, Walkertown, Dennis, Walnut Cove and Ladford to Madison, N. C., a distance of 32 miles. From Madison to Martinsville, Va., 28 miles, work is in progress and it is expected to complete the track by December 1 next. Twenty-five miles of the 58 from Martinsville north to Roanoke, Va., has recently been put under contract and about 500 men in all are now at work between Madison and Roanoke. The principal contractors are: Allen Mosely, Davis & Co., Wallers, Henry County, Va., 11 miles; McCabe Bros. & Co., Dan P. O., Franklin County, Va., 11 miles; Breen, Feely & Newby, Madison, N. C., from Walnut Cove, N.C., to state line, 28 miles; Breen & Feely, Martinsville, Va., from state line to Martinsville, Va. The maximum grades are 80 ft. per mile and sharpest curves 10 degrees. The two principle bridges yet to be erected are those at Mayo River, two 84 ft. lattice girders, and Smith River, two 84 ft. and one 125 ft. spans.

San Francisco & San Joaquin.—This company has undertaken the construction of a road from Fresno, Cal., to tide water in two years, work to be commenced in a month if right of way is granted. The company graded a number of miles of road through the San Joaquin Valley about two years ago, and it is always referred to locally as the San Francisco extension of the Atchison, Topeka & Santa Fe. I. R. Wilbur, the President, is quoted as saying that he "has reason to believe that the Atchison company will assist in building the road from Fresno to tide-water. There are 70 miles of road graded from Hill's Ferry to within 14 miles of Fresno."

Southern Pacific.—Work on the Merced division is now going on at a satisfactory rate. The grading is finished as far as Amsterdam, a distance of 10 miles. The construction train is out several miles from El Capitan, and track is laid for a distance of seven miles. A force will soon be put to work on the Oakdale end, and it is hoped to have the road in running order by Dec. 1.

Union Pacific.—Surveys have been completed for changing the Garfield Beach branch of the Oregon Short Line and Utah Northern, which extends westerly from Salt Lake City, to standard gauge. The section from Salt Lake City to Saltair Junction, 18 miles, is to be altered before the rest of the line, so that freight cars can be run from the salt works near that place to points on the main line without transhipment of freight at Salt Lake City. The work on the entire branch will be finished before the beginning of the excursion season next year.

United Railroads of Washington.—The roads now under construction by this company (all in the state of Washington) are as follows: 1. From Chehalis on the Pacific division of the Northern Pacific in Lewis County, in a general westerly direction to Shoalwater Bay, 60 miles. 2. From Centralia on the Pacific division of the Northern Pacific in Lewis County, in a northwesterly direction down the valley of the Chehalis River through Thurston and Chehalis Counties to Ocosta, 66 miles. 3. From Lakeview on the Pacific division of the Northern Pacific in Pierce County in a westerly direction to Olympia, thence to and down Black River

valley to junction with line numbered 2 above, 46 miles. Track has been laid from Centralia west 15 miles. It is expected all of these lines will be completed this year. The President of this company is James B. Williams, 35 Wall street, New York, and the Chief Engineer is J. W. Kendrick, St. Paul.

Waycross Air Line.—The Waycross Construction Co. has been organized in Georgia by Samuel Johnson, J. L. Sweat, of Waycross; William B. Stillwell, of Savannah, and L. B. Miller, of New York. The capital of the company is placed at $125,000. The company proposes to build and equip the Waycross Air Line road from St. Mary's, via Waycross, to Hawkinsville and Cordele, Ga.

West Virginia & Pittsburgh.—The line from Weston eastward to Buckhannon, W. Va., is completed, and the first train ran to the latter place on Sept. 1. The line from Weston south to Sutton is being completed as fast as possible, and it is expected to have the track all laid by Jan. 1, next. It is expected also to run trains to Three Forks, east of Buckhannon, by or before that time. The principal contractors on this road are T. J. Steers & Co., Stanley & Olds, Sullivan & Co., and F. H. Blodgett & Co., of Weston, W. Va.; Burns & Ross and Ross & Cameron, Burnsville, W. Va.

Wilmington, Chadbourn & Conway.—An extension of this road is proposed from Chadbourn on the Atlantic Coast Line northwest, a distance of 25 miles, to Lumberton, N. C., on the Seaboard & Roanoke. The survey will be commenced very soon.

Wilmington & Weldon.—The stockholders of this road, at a meeting in Wilmington, N. C., last week, authorized the extension and completion of the Nashville branch from its present terminus at Spring Hope, N. C., westward to either Raleigh, 35 miles, or Durham, 40 miles, or to any point on the Lynchburg & Durham Railroad. Authority was voted to increase the capital stock by an amount sufficient to cover this extension and to provide for the completion of the Fayetteville branch to the South Carolina state line. A vote was also passed authorizing a stock issue to cover the Scotland Neck extension to Kinston & Washington.

GENERAL RAILROAD NEWS.

Boston & Maine.—The company has filed with the Massachusetts Railroad Commissioners a statement of its earnings for the three months to June 30 and the year.

April 1 to June 30.

	1890.	1889.	Inc or dec.
Gross earnings	$3,838,128	$3,431,179	I. $401,949
Operating expenses	2,373,580	2,111,367	I. 262,213
Net earnings	$1,459,548	$1,319,812	I. $139,736
Other income	22,892	1,291	I. 21,601
Total net	$1,482,441	$1,321,104	I. $161,337
Interest	$ 213,748	$ 118,090	I. $ 95,658
Taxes	187,606	146,334	I. 41,272
Rentals	625,826	750,004	D. 124,178
Total charges	$1,027,180	$1,014,429	I. $ 12,751
Total net earnings	1,482,441	1,321,104	I. 161,337
Balance	$455,261	$306,675	I. $148,586

July 1 to June 30.

	1889-90.	1888-89.	Inc. or dec.
Gross earnings	$14,587,025	$13,528,523	I. $1,058,502
Operating expenses	9,338,492	8,800,172	I. 538,320
Net earnings	$5,248,533	$4,728,351	I. $520,182
Other income	359,770	311,180	I. 58,590
Total net	$6,608,304	$5,029,532	I. $578,772
Charges	4,005,687	4,011,773	D. 6,086
Surplus	$1,602,617	$1,017,759	I. $584,858

The surplus, after deducting the dividend for the year (9½ per cent.), is $502,616, as against $457,718 in 1889.

Cheshire.—Negotiations are in progress between this company and the Fitchburg road for a lease or merger with the latter line, but the matter has not progressed far enough to announce the terms upon which the arrangement will probably be made, and the consummation of the negotiations may be indefinitely postponed.

Chicago, Burlington & Quincy.—The earnings and expenses for July and the six months to July 31 were as follows:

Month of July:	1890.	1889.	Inc. or dec
Gross earn	$2,721,398	$2,671,746	I. $49,652
Oper. expenses	1,950,723	1,613,573	I. 337,149
Exp. and fixed charges.	2,712,612	2,357,959	I. 354,653
Net earn	8,786	313,787	D. 305,000
Jan. 1 to July 31:			
Gross earn	19,653,423	18,018,272	I. 1,640,150
Oper. expenses	13,296,163	12,196,997	I. 1,099,166
Exp. and fixed charges.	18,629,389	17,407,696	I. 1,221,693
Net earn	1,029,034	610,576	I. 418,457

Chicago, Rock Island & Pacific.—There is considerable speculation "on the street" in regard to the financial situation of the road. Rumors were in circulation last week that the management was confronted with a large deficit and that President Cable was about to resign. These rumors were promptly denied at the company's offices, but a great many are still inclined to think that there is something behind them. Vice-President Purdy is quoted as saying that "the statements telegraphed from New York are made up of juggled figures. They are the figures of April 1, 1888, and not, as they profess to be, figures of April 1, 1889, compared with those of April 1, 1890. Regarding the alleged disappearance of $2,000,000 in 5 per cent. extension bonds, I will say that we take the 6 per cent. bonds of the Chicago, Kansas & Nebraska, and then issue Rock Island 5 per cent. bonds with the Chicago, Kansas & Nebraska bonds as collateral security; that $2,000,000 in bonds had not yet been needed for this purpose, but was so used later on. We have not sold or disposed of a bond or share of stock which we held in any of our auxiliary or connecting companies." The estimated gross earnings of the entire Rock Island system for August were $1,546,758, a decrease as compared with August, 1889, of $165,952.

Danville & New River.—This narrow gauge road, running from Danville west to Stuart, Va., 75 miles, was sold Aug. 27 at public auction under the claims of bond holders. J. Wilcox Brown, of Baltimore, was the purchaser, and it is said the road was purchased for the Richmond & Danville.

Monongahela River.—This road, which was begun last fall, was put into operation Aug. 1. The line extends from Fairmont, W. Va., southerly to Clarksburg, W. Va., a distance of 32 miles, following the West Fork of the Monongahela River.

New York, Lake Erie & Western.—The following statement shows the earnings of the system for July and the ten months to August 1:

Month of July.	1890.	1889.	Inc. or dec.
Gross earnings	$2,504,124	$2,538,440	D. $34,316
Oper. expenses	1,599,869	1,656,515	D. 56,646
	$904,255	$881,925	I. $22,330
Less proportions due leased lines	237,654	218,872	I. 18,782
Net earnings	$666,601	$663,053	I. $3,548

Ten months, Oct 1 to Aug. 1.

	1890.	1889.	Inc.
Gross earnings	$23,700,534	$21,699,438	$2,001,096
Oper. expenses	15,581,183	14,187,933	1,393,250
	$8,119,351	$7,511,505	$607,846
Less proportions due leased lines	2,117,805	1,926,712	191,093
Net earnings	$6,001,546	$5,584,793	$416,753

Pennsylvania.—President Roberts, in an interview in the Philadelphia *Ledger*, last week, stated that the ton mileage on the road (east of Pittsburgh) for the first six months of this year increased 737,600,000, or 27 per cent. over that of the same period last year. The gross receipts were 17 per cent. greater, the rate per ton per mile being only .055 cents, which is 8 per cent. less than the average rate in the first half of 1889. The capacity of the road has been taxed to such an extent that many items of expense have been abnormally increased thereby, and the increase of traffic during the month of July has been even larger proportionately than for any month in the first half of the year. Coal and coke have afforded the largest part of the increase.

Pittsburgh, Cincinnati, Chicago & St. Louis.—This company, which is the consolidation of the Pittsburgh, Cincinnati & St. Louis, the Chicago, St. Louis & Pittsburg, the Cincinnati & Richmond, and the Jeffersonville, Madison & Indianapolis, received its charter from the Secretary of State of Ohio, Aug. 28. This was issued after the payment under protest of the full fee of $75,000, being one-tenth of 1 per cent. on the capital stock, the Secretary having declined to accept payment based upon the number of miles of road in Ohio.

Pittsburgh & Western.—The following statement is said to have been issued in connection with the announcement of a change of officers, but the impression of its being an official circular may be due to the reporter's skill in wording his introduction. "As three-fourths of the business of the road is interchanged with the Baltimore & Ohio, and as that company is now building a short line from Akron to Chicago Junction, with the intention of throwing its through freight and passenger business over the Pittsburgh & Western, the owners of the property and the voting trustees, who represent the bond holders, have thought it best to make a closer alliance with that company than has heretofore existed." No idea of the nature or scope of the agreement is given.

Rochester, Hornellsville & Lackawanna.—A motion was argued at Rochester, Aug. 28, for the appointment of a receiver for the above road.

Union Pacific.—The preliminary statement of earnings and expenses for July gives the following figures:

Month of July.	1890.	1889.	Inc.
Mileage	7,548	7,359	189
Gross earnings	$3,837,362	$3,573,627	$263,734
Oper. expenses	2,221,590	1,972,276	252,313
Surplus	1,612,772	1,601,351	11,421
Seven months to July 31.			
Av. miles operated	7,170	6,985	185
Gross earnings	23,739,112	20,477,974	3,261,138
Oper. expenses	16,227,764	13,036,316	3,191,448
Surplus	7,511,348	7,441,658	69,690

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, Sept. 3, 1890.

The application to the Interstate Commerce Commission for relief from the operations of the recent order in regard to rates on food products, referred to last week, has resulted in a suspension of the order until Sept. 15 (not Oct. 1 as reported). In the meantime the Commissioners will have opportunity to consult and determine whether they will reopen the case or not. The directors of the Chicago, Rock Island & Pacific have indorsed the action of President Cable in determining to put in effect the rates ordered by the Commission without protest.

The Trans-Missouri Freight Association has been unable to make effective the advanced rates on salt from Kansas City points Sept. 1, as was expected, owing to a failure of some of its roads to issue tariffs in season. They propose to put in the interstate rates from that territory Sept. 9 and Kansas state rates Oct. 20. It is not thought that this will demoralize rates in territory in which the new rates are effective Sept. 1.

The regular monthly meeting of the Western Passenger Association was begun at St. Louis yesterday, but no definite results have been arrived at as yet. A great many complaints have been made that secret rate-cutting has been going on, and that the agreement has been practically annulled by the extent to which this has been carried. Reports from Chicago scalpers' offices seem to fully justify these complaints. One account says: "Every Western road is apparently issuing these illegal tickets. In the majority of cases the manipulation was accomplished by issuing tickets to points beyond large cities and the rate cut from 25 to 50 per cent. by the road issuing the tickets redeeming the unused portions at full local rates. For instance, three roads at least are cutting the $12.50 rate to Kansas City to $9 by selling to scalpers tickets reading to Beatrice or Lincoln and redeeming the unused portion beyond Kansas City. The same plan is worked on Denver business by selling tickets reading to Ogden or Helena and reducing the $30.65 Denver rate to $24. No attention is paid to so-called descriptive tickets. The Atchison road had one to-day with full description punched in it, but which was used by four persons differing in sex and color from the original buyer."

Messrs. J. M. Johnson and A. C. Bird, acting as a special committee on the proposed uniform classification, have prepared a report and submitted it to the Western Freight Association, in which they say that the theory of their work has been that they should present a classification that can safely be adopted as a starting point. Uniformity of classification is contingent upon a reconstruction of rate sheets. The recommendation involves 11 classes. The classification of less than carload rates is now confined to the first four classes; in the proposed classification these articles have been distributed over five classes, and with slight exceptions all of the carload classes are embraced in the 6th to 11th, inclusive, the exceptions being some articles in carloads of extraordinary bulk or value which are rated higher than 6th. A hasty glance at the proposed classifications, they say, will lead to the belief that large reductions have been made, but they believe that the general results of the new classification in connection with the proposed rates will produce substantially the same revenue obtained by present methods. The distribution of general merchandise among the eleven proposed classes they think will do away with many special tariffs. In conclusion, they urge co-operation with the various State Commissioners and authorities in the preparation of tariffs, as otherwise the new classification will conflict with various state laws.

The Rock Island and Alton gave notice yesterday that they would not only conform to the order of the Interstate Commerce Commission reducing grain rates, but would go one cent lower and make the rate 19 cents on wheat from Kansas City, St. Joseph and Council Bluffs to Chicago, instead of 20 cents as ordered. The wheat rate will be 20 cents from all other Missouri River points when the remaining roads get ready to reduce the rate. The 19-cent rate is made to preserve the present differentials via St. Louis. On other grains the Rock Island and Alton will make a 17-cent rate as ordered by the Commission.

Traffic Notes.

The Toledo, St. Louis & Kansas City Railroad begins this week to run through passenger trains between Toledo and St. Louis each way daily.

The Cleveland, Cincinnati, Chicago & St. Louis has made arrangements to run through trains between Chicago and Louisville, Ky. The route is by way of the Ohio & Mississippi from North Vernon, Ind., to Louisville.

A rate of 75 cents per 100 lbs. first class (other classes in proportion) has been made from New York to Kansas City by way of steamer to Savannah, and thence over the Central of Georgia, Kansas City, Memphis & Birmingham and Kansas City, Fort Scott & Memphis.

The Railroad Commissioners of Missouri and Kansas have been making a joint investigation at Kansas City into the business of ticket brokerage. This action is taken by suggestion of the Interstate Commerce Commission, which has definitely outlined a plan of action to determine the legality of the scalper business.

The Southwestern Railway & Steamship Association has been formed to take the place of the Southern Interstate Association. The old association was composed of the Kansas City, Fort Scott & Memphis, the Missouri, Kansas & Texas, the Missouri Pacific, the St. Louis, Arkansas & Texas, the Iron Mountain and the St. Louis & San Francisco. The new association will be much stronger, there being, in addition to the lines mentioned, the Southern Pacific, the Gulf, Colorado & Santa Fe, Morgan's Steamship Line and the Mallory and Cromwell lines. The headquarters will be continued in St. Louis. Richard Gray, General Traffic Manager of the Southern Pacific, was elected Chairman of the new body, but it is not known whether he will accept.

The New Bill of Lading.

The second attempt to put into effect the uniform bill of lading on all roads leading eastward from Chicago has resulted in another failure. It was to have been adopted Sept. 1 in accordance with the recent agreement of the Chicago Freight Committee of the Central Traffic Association, but the Wabash declined to use it on through shipments in connection with the Canadian Pacific, and the Chicago & Grand Trunk refused to use it unless the Wabash applied it on all through business. The Big Four would only adopt the bill in case all other roads adopted it, and the result was that three of the Chicago roads continued giving their patrons the old form of receipt on Sept. 2. The Lake Shore notified the other roads that it would probably give official notice of the abandonment of the bill at the coming meeting of the Central Traffic Association. The roads have formed a committee for the purpose of receiving, hearing and adjusting complaints from shippers. Besides the Chicago railroads and the trunk lines the lake and rail lines are represented by F. J. Firth, and the Southern Railway & Steamship and Coastwise associations by D. D. C. Mink and W. H. Stanford. It was also decided to invite to membership Commissioners Midgley of the Southwestern, Faithorn of the Northwestern, and Finley of the Trans-Missouri associations. Commissioner George R. Blanchard, of the Central Traffic Association, was made permanent Chairman and F. H. Hoyt was made Secretary. There will be added to the committee representatives from the New England railroads in order to complete the membership desirable in adjusting disputed questions. The committee appointed four sub-committees. The first one is to receive and consider the report of the Chicago merchants; the other committees are standing ones on export bills of lading, live stock contracts and releases.

East-bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, Aug. 30, amounted to 52,376 tons, against 64,317 tons during the preceding week, a decrease of 11,941 tons, and against 43,755 tons during the corresponding week of 1889, an increase of 8,601 tons. The proportions carried by each road were:

	W'k to Aug. 30.		W'k to Aug. 23.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	3,562	6.8	6,733	10.5
Wabash	2,514	4.8	3,994	6.2
Lake Shore & Michigan South.	9,441	18.0	9,592	14.9
Pitts., Ft. Wayne & Chicago	5,755	11.0	8,615	13.4
Chicago, St. Louis & Pitts.	6,138	11.7	7,471	11.6
Baltimore & Ohio	2,765	5.3	4,040	6.3
Chicago & Grand Trunk	9,495	18.1	9,537	14.8
New York, Chic. & St. Louis	5,608	10.7	7,724	12.0
Chicago & Atlantic	7,098	13.6	6,611	10.3
Total	52,376	100 0	64,317	100.0

Of the above shipments 2,206 tons were flour, 25,807 tons grain, 2,044 tons millstuffs, 3,684 tons cured meats, 669 tons lard, 4,716 tons dressed beef, 1,422 tons butter, 759 tons hides, 405 tons wool, and 6,910 tons lumber. The three Vanderbilt lines together carried 35.5 per cent., while the Pennsylvania lines carried but 22.7 per cent.